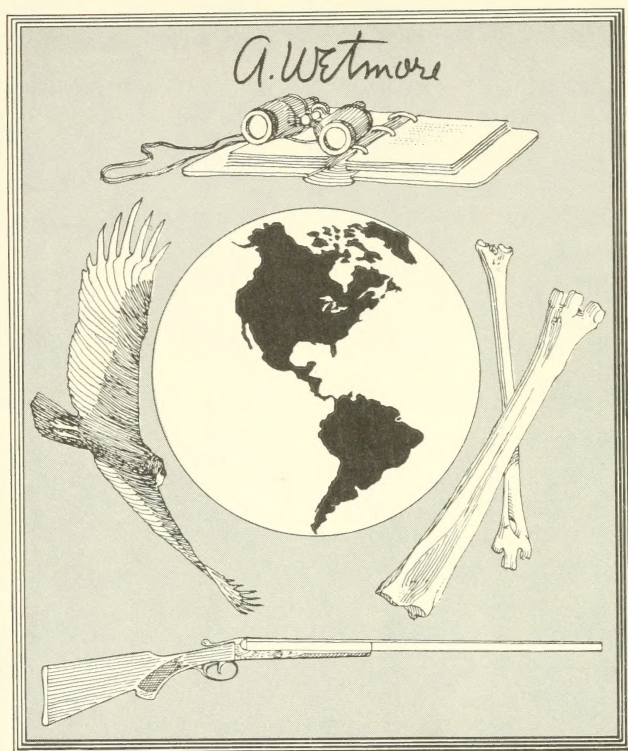


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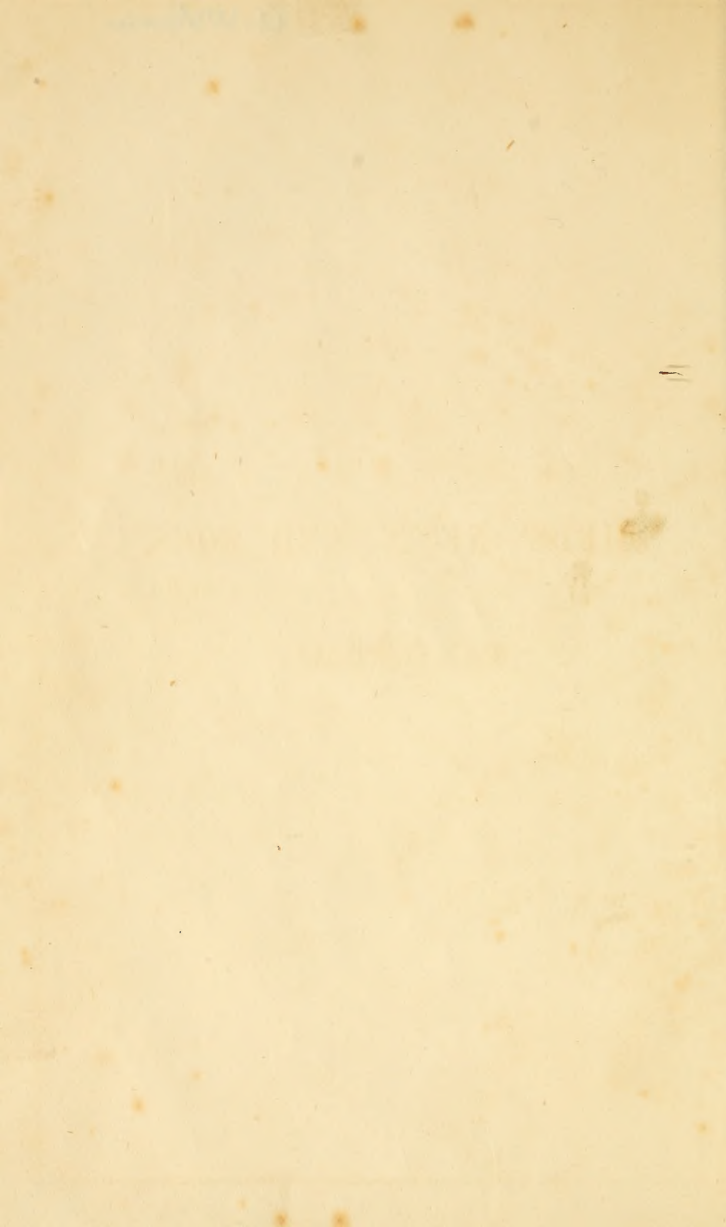
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A. Wetmore

BIRDS' NESTS AND EGGS

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BIRDS' NESTS AND EGGS.

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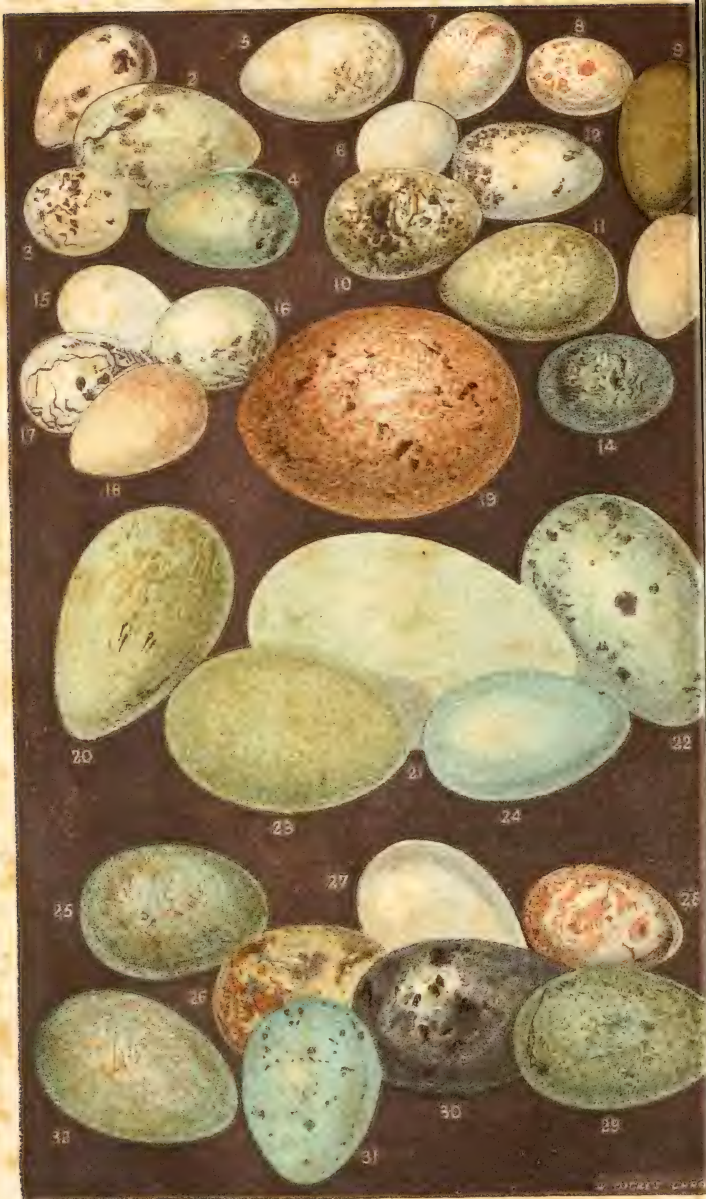
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NESTS AND EGGS.

THE eggs of birds, like most of the productions of nature, are wonderfully perfect in the symmetry of their form, as well as beautifully rich and harmonious in their colouring. In form, they range in every curve of the line of beauty, from the round and almost spherical egg of many owls to the acutely pointed oval of the blackbird and most of the small birds. On this diversity of form in the eggs some authorities, thinking they had discovered the order of nature, have attempted to form a system of classification; but a very brief examination dissolves this dream,

for, in the single family of the owls, about whose genera no doubts can exist, we find the widest diversity of form; the egg of the eagle-owl being nearly round, that of the long-eared owl an obtuse oval, while that of the short-eared owl presents a perfectly ovate shape. The rich and beautiful colouring of many of the eggs has also much engaged the attention of some inquirers, as we shall see.

With returning spring all nature revives; the birds which remain with us all the winter seem restored to life by the first fine day; those which departed on their journey to a warmer climate in the autumn return from their migration; and once more the woods and fields re-echo with their song. The rook and the crow give the first intimation that the pairing season is at hand. Their cawing is incessant, as is also the industry with which twigs and branches are conveyed to their intended dwelling-place in the tree-tops.

A little later, and the smaller birds make the grove sound musical, as their several songs of love are poured forth. From this time the male becomes the slave of the female. He sings to charm her; he labours incessantly to aid her; he gathers materials for the nest; he assists her in building, and superintends the workmanship; and marvellous it is to see them, without other instruments than beak and claws, build and weave or sew the nest, according to their peculiar habits. Observe the materials which they employ with so much effect, and with a discernment which indicates something approaching to intelligence. Look how skilfully one weaves the catkins of the willow, the poplar, and thistle down, surrounding it by stronger fibres, and the address with which it is suspended at the extremity of some slender pendulous branch, beyond the reach of anything that only runs or creeps. Another, having made its calculations, fixes its nest so near to the surface of the water, that as the wind sweeps through the four reeds to which it is so firmly and yet so delicately attached, its bottom just touches the water without being immersed, even in the most violent storm.

The eggs of birds vary again according to the species; not only in respect to their colour, but in their form also. They are white, blue, grey, green, red, or ash-coloured; and, besides the general predominant colour, they are covered with spots, dashes, or streaks of darker shades, which are regularly or irregularly grouped, sometimes towards one end, sometimes the other. Dr. Carus attempts to explain this diversity of colour: he considers it to be the result of a process of decomposition of

the blood in the ovary, mixing with the calcareous salts of which the shell is composed. "It results not only from an excretion of the calcareous salt," he says, speaking of the shell; "for the blood of the oviduct, being in a sort of inflammatory state, mixes itself with these salts, forming certain products, to which may be attributed the divers colours of the eggs of birds. All these varied tints are the result of the decomposition of the blood." It is possible that the colour of eggs may be due to some such cause, but the subject is open to doubt; for if the source of the colour and spots is in the blood mixing in the uterine vessels with the salts of the shell, it is difficult to conceive why all eggs are not spotted, and why those that are spotted vary in tint. Besides, the colour, whatever it may be, is only external, forming a thin coating only; whereas, if it had been produced by a mixture of decomposed blood and the component parts of the shell, the whole shell would partake of the prevailing colour. In the meanwhile, the question is still one of doubt; a doubt, perhaps, which chemical analysis would easily solve were the question one of any moment.

It has been observed that eggs laid in cavities or dark places, where light is altogether absent, are generally white and free from spots; such are those of the several species of owls, the kingfisher, the wood-pigeon, which builds its nest in the depths of some deeply-shaded wood, and some others which might be named. Those, on the contrary, which are laid exposed to the light, are generally more or less richly coloured. Might we not conclude from these facts that light has a marked action upon the colouring of the eggs, as it has on other productions of nature? The flower which blooms in shade and obscurity, is it not pale and shrivelled, like everything denied the vivifying rays of the sun? The birds themselves being a proof of this simple fact; for those of the most brilliant and varied plumage are the inhabitants of inter-tropical countries.

Now, as eggs are generally spotted, and as the notion prevails that the stains increase not in size but in intensity, in proportion as the embryo develops itself, some ornithologists have thought they could trace a resemblance between the spots of the eggs, the nest of the birds, and their plumage. All application, however, of a rule, which would deduce the colour of a bird from the colour of the eggs, appears to be unsupported by any number of facts; on the contrary, all the facts are opposed to it. Thus, the golden pheasant, a bird so

richly marked, produces a pale-coloured egg. The colour of eggs has, therefore, no connection with the plumage of the bird.

Whatever may be the explanation, it is obvious enough, of course, that the pigment is animal matter; but it would appear, from the investigations of M. Geoffroy de Saint-Hilaire and other scientific men, that the egg, immediately before it is deposited, is white. The colour may also be scraped off partially immediately after it is laid; and when "blown" for preservation, that is, when deprived of its albuminous contents, the colour fades when exposed to the sun, as any one may satisfy himself by glancing at the collection of birds' eggs in the British Museum, where the efforts of the obliging curator have altogether failed in devising means for preserving their markings; so that the rich ruddy blotches of the peregrine and other falcons' eggs, which are the most striking in their markings, as may be seen on our plate, are there reduced to a sober grey. The vividness of the colours also appears to depend on the bird being in a healthy state. Many variations are found in the colour of eggs of the same species, and the eggs of birds disturbed in the act of laying are always deficient in their markings; the animal economy seems to be disturbed by the alarm, and imperfect colouring is the result.

As to the form and size of eggs, nothing is more variable; from that which the ostrich deposits in the sands of the desert to that of the wren, or the still more minute humming-bird, what a difference in size, and, above all, what variety in form! Some experiments, undertaken by M. Geoffroy de Saint-Hilaire in Egypt, and by M. Florent-Prevost in France, enable them, as they assert, to declare, on seeing an egg, the sex of the bird which it contains. After numberless observations, they conclude that the globular eggs, that is to say, those whose extremities are nearly round, are females, and that males come from those more pointed. It appears also, that if the void which appears on looking at an egg across a luminous body occupies one of the ends, the sex is male; but if situated on either of the sides, it is a female.

The great variety in their markings has given rise to another notion, that the colour of eggs accords with the locality as well as the materials of which the nest is composed, and that it is intended as a provision for their concealment from those animals which prey upon them. This is not supported, however, by observed facts; nothing can be more in con-

trast with the brown clay and withered grass and moss of which the nest of the blackbird is composed than the light blue colour and brown spots of its eggs. Again, the brilliant white and delicate pink spots of the wren's or bottle-tit's egg would at once attract attention were the nests of each less carefully concealed. The idea is, besides, at variance with the more rational doctrine, that the birds themselves are, like all other creatures, gifted with an instinctive power of selection, which is employed in securing the safety of their offspring. This faculty it is which leads them to build their nests in obscure and sometimes inaccessible places, and to cover them with materials calculated to conceal their stronghold from the prying eye of curiosity. If the doctrine receives any support from the facts of natural history, these facts are found connected with those birds whose nest-building scarcely deserves the name. Those familiar with the haunts of the golden plover will have no difficulty in discovering the slight hollow which it has scraped in the wild moorland, but the colour of its four pear-shaped and grey-spotted eggs, the narrow ends of which all meet in the centre, will certainly not assist their search. Nevertheless, as a generally observed fact, the egg presents a decided contrast to the surrounding colours of the nest.

If anything were wanting, indeed, to enhance the pleasure of egg-hunting, it would be found in the wonderful skill which many of these little creatures exhibit in the construction of their nests, in the choice of situation, and in the choice of the materials employed. We recognize a provident instinct, which almost amounts to the higher intelligence usually termed reason, in the care with which they guard themselves and their young from the assaults of their enemies and from the weather. It exhibits the hand of the Creator giving its first direction to the art, which results in providing for the perpetuation of their species. It marks the all-pervading fiat which has declared that not a sparrow falls to the ground but with His permission.

Among our home birds remarkable for the architecture of their nests, we may mention the magpie. As we have already seen, this bird's nest is quite an aerial fortress. Built on some tall tree, whose large and branchless stem renders it inaccessible to the most daring of school-boys, the magpie's nest is a conspicuous spheroidal mass, composed first of a layer of twigs, curiously interwoven and crossed, on which is spread a quantity of mud; then is formed a dome of twigs of the sloe or hawthorn, loosely

but securely interlaced, while the bottom of the interior is lined with soft fibrous roots, an aperture being left in the side of the nest, which is barely sufficient to admit the bird. Why this bird should find it necessary to render its nest so defensible, has been a mystery to the naturalist; but it is probably explained by the fate of an unhappy colony of magpies, whose story is recorded in the *Magazine of Natural History*. The birds in question had built their nests on a lofty grove of trees, in the neighbourhood of which a pair of tawny owls had also established themselves. To feed their young, the parent owls had made several desperate assaults on several of the magpies' nests, which had been gallantly defended; the assailing owls had been repeatedly repelled; but at last the remains of young magpies were observed under the favourite perch of the young owls, an indication not to be mistaken that the stronghold had been successfully stormed. One morning appeared there the head and feathers of an old magpie, which must have been dragged from the nest while roosting.

After this, a sort of truce would seem to have been concluded, and for a whole year the owls remained quiet; but in 1845 the same pertinacious attack upon the nest of a pair of magpies, built on the very highest branch of a sycamore, near to their eyrie, commenced. One day Mr. Carr, who records the event, was roused by a shriek of agony like that of a hare caught in a snare; he rushed to the spot, and arrived just in time to prevent another murder! One of the owls was in the act of drawing the old magpie out of her nest by the head. By striking the trunk of the tree violently, he succeeded in separating the combatants for the time. In revenge, before the next morning, his only pair of young rooks had disappeared from their nests, and a decree of doom went forth,—the young owls forthwith paid the penalty of their voracious appetites! It is thus not without reason that the magpie fortifies her nest, and surrounds it with palisades; for, besides the owl, it is subject to visits from weasels and other prying quadrupeds.

The nest of the long-tailed tit (*Parus caudatus*) is extremely beautiful, being of a very regular oval form, six to seven inches long and three and a half to four and a half broad; it is usually composed of moss and wool, crusted externally with grey lichens, the whole kept together by means of the flaxen fibres of plants, some wool, and delicate filmy shreds interwoven in a transverse direction. It is usually attached to, and supported by the twigs of a branch of a tree.

The small grey lichens with which it is covered all over form so close an incrustation with the branches of the tree from which it is suspended as effectually to conceal the numerous eggs it contains, for this little creature lays and hatches as many as sixteen eggs. The aperture is round, and only an inch and a quarter in diameter, with an inch and a half of dome above the opening. The outer shell of the nest is an inch and a half thick; its inner surface is stuck all over with feathers, being not only lined but nearly filled with similar materials; one nest, described in some MS. notes of the lamented Mr. Macgillivray, now before us, containing no less than six hundred and eighty-nine feathers, three-fourths of them large ones, being those of the domestic fowl, pheasants, turkeys, rooks, and other birds.

But the most artistic specimens of nest-building among British birds are greatly exceeded by some of the tropical birds. The nest of the tailor-bird of Africa and Asia, so called from the skill with which the nest is constructed, is sewn together by the long fibrous filaments of various plants; the materials being selected with a wonderful degree of intelligence. In form it is not unlike the bottle-tit's nest, but infinitely more elaborate. Even this edifice is far exceeded by that of some of the toucans of the Philippine Islands, whose nest, suspended at the extremity of the most slender and flexible branches, and beyond the reach of any beast of prey, consists of a series of chambers, one built above the other, with an entrance from below; the same nest being used by several pairs of birds, all of whom have either laboured simultaneously at its construction or added to it subsequently.

The pensile grosbeak, another of these gregarious African birds, makes a basket-nest of straw and reeds, interwoven into the shape of a bag, with the entrance below, the top being fastened generally on trees that grow on the borders of streams, or on those which impend over precipices. On one side of this hanging edifice is the true nest. The bird does not build a distinct nest every year, but fastens its new basket to the lower end of the old one—a very singular arrangement. The object in choosing this position over a precipice or stream for the nest is obviously to secure their offspring from the assaults of their numerous enemies, particularly the serpent race. To increase the difficulty of access to these tree-rocked cradles, the entrance is always from below, and frequently through a cylindrical passage, of twelve or fifteen inches in

length, projecting from the spherical nest exactly like the tube of a chemist's retort. The whole fabric is most ingeniously and elegantly woven of several species of very tough grass; and the wonderful foresight displayed is calculated to excite the highest admiration. Twenty or more of these beautiful nests have been observed hanging from a single tree.

Another species, the baya, or bottle-nosed sparrow, is remarkable for its pendent nest, uncommon sagacity, and brilliant plumage—the head and breast being of a bright yellow, giving it a splendid appearance in the rays of a tropical sun. They associate in large numbers, and cover extensive clumps of palmyras, acacias, and date-trees, with their nests. These are formed by long grass, woven together in the shape of a bottle, and suspended by one end to the extremity of a flexible branch, the more effectually to secure the eggs and young from serpents, monkeys, squirrels, and birds of prey. The nest contains several apartments, appropriated to different purposes; in one the hen performs the office of incubation; another, consisting of a little thatched roof, and covering a porch without a bottom, is occupied by the male.

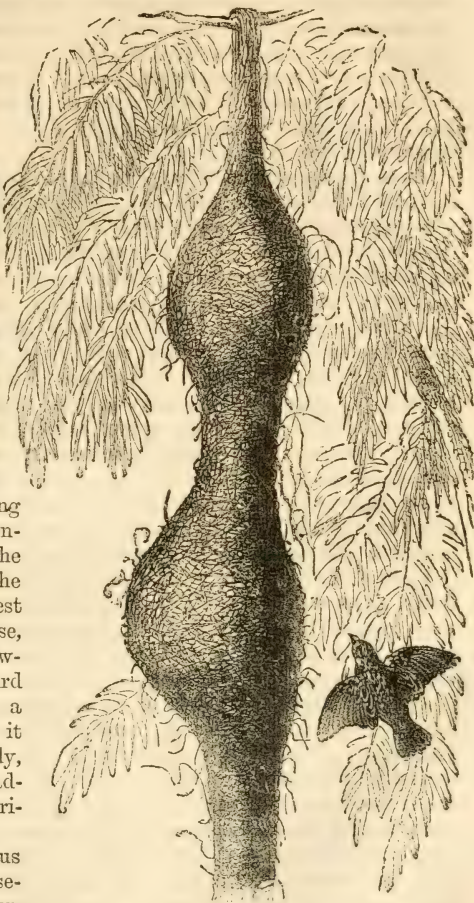
The real nest is concealed from exposure by a covering of hay, to secure itself and young ones from their deadly enemy, the squirrel, as likewise from injury by the weather, which it escapes by making the nest like a steeple hive, with winding passages, and before which hangs a penthouse for the rain to pass down. It is suspended by so slender a thread that the squirrel dares not venture on it. Hundreds of these pendulous nests, it is said, may sometimes be seen on the same tree.

“The industry of these birds,” says Paterson, “seems almost equal to that of the bee. Throughout the day they seem to be busily employed in carrying a small species of grass, which is the principal material they use for their ordinary work as well as for addition and repairs. Though my short stay in the country was not sufficient to satisfy me, by ocular proof, that they added to their nests as they annually increased in numbers, still, from the many trees that I have seen borne down by the weight, and with their boughs completely covered, it would appear that this is really the case. One of these deserted nests I had the curiosity to break down. There are many entrances, each of which forms a regular street, with nests on each side, about two inches apart. The grass with which they build is called Bushman's grass, and I believe the seed of it to be their principal food,

though I found the wings and legs of several insects in the nests. From every appearance, the nest which I dissected had been inhabited for several years, and some parts were much more complete than others."

The weaver-bird of India constructs a nest of vegetable fibres, which it interlaces in such a manner as to form a sort of purse, as represented in the engraving. It is suspended from the higher branches of trees overhanging rivers, and the entrance is at the lower end. The first year the nest is a simple purse, but in the following year the bird attaches to this a second, and so it proceeds annually, with a similar addition to the curious fabric.

This marvellous association of several pairs labouring together is particularly apparent in the species to which the French naturalists have given the name of the republican gros-bec, the approaches to their nest being of the most artful description, while the nest is, externally, only one mass of



vegetable fibre. These are only a few of the facts which may be adduced to prove that birds are gifted with an instinctive power of selecting materials and positions calculated to conceal their eggs and progeny from their enemies. By far the most numerous class of birds build their nests in trees or bushes, and a nest, in spite of the arts of the builders, being a bulky excrescence, is easily discovered by a practised eye, and, once discovered, concealment of the eggs would be impossible.

As to the eggs themselves, their well-known external covering is a light, porous, and brittle shell, of chalky formation, which is pervious to the admission of oxygen and carbonic acid from the atmosphere, which are essential to the development of the vital principle which they contain. Within the shell is a thin membranous lining, which covers the whole, terminating in a small bag at the obtuse end, which receives the air and communicates with the interior organism of the egg. Within this lining is the white, or albumen, which, under the microscope, reveals some very curious physiological forms, which it would be foreign to our purpose to enter on here. Within this layer is the yellow matter, known as the yolk or vitellus of the egg.

An examination of the statistics of eggs leads to the conclusion that the birds useful to man produce them in the greatest numbers. The domestic fowl and the gallinaceous tribes generally lay an unlimited number of eggs; those smaller birds which live on insects, as if for the purpose of keeping down these enemies to vegetation, lay a large but limited number of eggs. In falcons and owls the number varies from two to five, the largest and fiercest birds having the fewest eggs.

But our present object is to collect and prepare eggs and nests. The pursuit is sometimes objected to on the score of inhumanity; but it is not impossible to gratify a rational curiosity and avoid the other alternative. One or two eggs taken from a nest does not, probably, much affect the mother bird: taking the whole nest, indeed, in some species, only leads to their building a second; for it seems pretty well ascertained that most birds, after a time, will build a second and even a third time, although at each successive laying the eggs are said to be smaller and less numerous. We cannot, then, advise our bird-nesters to take more than one or two eggs from any one nest, and the only excuse for taking the nest itself is when a collection is being formed; even then, if possible, let the nest

remain till the young fledglings have left it on their own independent career.

A collector can rarely pick up, with his own hands, any large proportion of even a small collection. "How many, for example," asks Mr. Macgillivray, "have robbed the eagle's or the osprey's, or scaled the magpie's nest, or laid their grasping hand on the eggs of the raven (which command half-a-crown apiece among the London dealers), or even the hooded crow or the chough? Nevertheless, let him who can, search for himself, otherwise he will miss much knowledge." It is told of the Abbé Manesse, who rendered great service to science by his observations on birds and eggs, and their manner of laying, that the whole of his superb collection was collected by himself; he confided in no one, and added no egg to his collection which he had not verified with his own eyes. His practice was to prepare himself for climbing by putting two spikes on his boots, and encircling the tree as well as his own body with a strong girth, and with this apparatus, when he was far on the shady side of forty, did the good abbé scale the loftiest tree that magpie, or rook, or wood-pigeon, chose for its castle. One of his rules was, to admit no nest or egg into his collection until he saw the bird in or flying out of the nest, thus identifying the species. His home career was cut short by the French Revolution, but, as an emigrant, he took every opportunity of enlarging his collection, which became the most perfect in Europe, and was presented, with his MSS. and drawings, in 1817, to the French Institute.

The egg collector must pursue his task under many difficulties. In robbing the nest situated on lofty trees he will probably have to descend with the treasure in his mouth, for the fewer incumbrances he ascends with the better. On reaching the ground the eggs should be carefully marked, and placed in one of the tin boxes he should carry in a bag. In order to preserve them, drill a hole near each end with a triangular needle, twirling the needle gently between the finger and thumb; then apply the mouth to one of the holes, and blow out the contents at the other, washing it afterwards with a solution of gum and water, gently injected from a syringe; this gives strength and solidity to the shell, and preserves the membrane; the holes may afterwards be filled with wax or covered with thin paper, but no gumming, varnishing, nor washing outside. When thus prepared, and perfectly dry, the eggs may be fixed upon pieces of cork, or, better still, in small boxes, just large enough to contain them, having glass tops, or they may be kept in

NESTS AND EGGS.

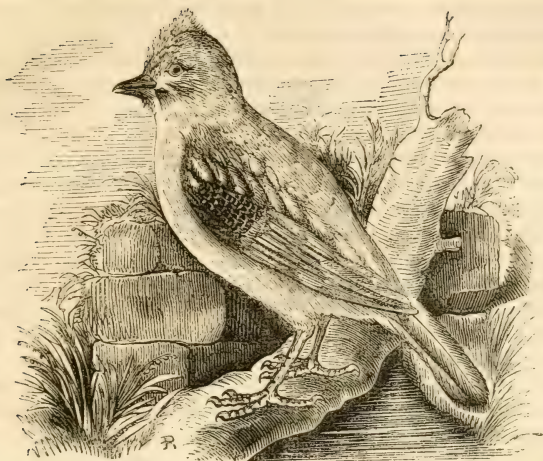
drawers, having cotton or chopped moss for them to rest upon; but in whatever mode the collection is arranged, the eggs must be excluded from the light, otherwise the colours will inevitably fade. The names and description should be written on the box or a slip of paper, and not on the egg itself.

Where there is a glazed case or case of drawers available, sufficiently large, and capable of having the light excluded, the most useful arrangement would be to place the eggs in the proper nest; but this could only apply to the smaller species of birds' nests.

The following eggs are represented in the plate, and are described in the succeeding pages:—

- | | | |
|-----------------|-------------------|--------------------|
| 1. Chaffinch. | 12. Greenfinch. | 23. Jay. |
| 2. Hawfinch. | 13. Goldfinch. | 24. Starling. |
| 3. Siskin. | 14. Titlark. | 25. Redwing. |
| 4. Bullfinch. | 15. Wren. | 26. Missel Thrush. |
| 5. Red Shrike. | 16. Linnet. | 27. Water Ouzel. |
| 6. Bottle-tit. | 17. Yellowhammer. | 28. Blackcap. |
| 7. Blue-tit. | 18. Robin. | 29. Fieldfare. |
| 8. Cole-tit. | 19. Kestrel. | 30. Ring Ouzel. |
| 9. Nightingale. | 20. Magpie. | 31. Song Thrush. |
| 10. Woodlark. | 21. Raven. | 32. Blackbird. |
| 11. Skylark. | 22. Jackdaw. | |





BIRD-NESTING IN FIELDS AND COMMONS.

Away from the busy haunts of town-life, every hedgerow, field, and common, is alive with the song of birds; the familiar sparrow chirps on the housetops; a thousand songsters pursue their busy avocations in the garden, the orchards, and the hedgerows; some searching, like robbers as they are, for the seeds just sown in the ground, but the majority of them aiding the cottager to subdue the larvæ of insects, which would presently, without this help, overwhelm him with their ravages. It is a bright April morning. All the birds which breed with us are either building their nests, or, that office past, they are engaged in laying or sitting on the eggs, which it is our object to collect. It is to be feared that this our intention is not to be defended on any fair principle of *meum* and *tuum*; on what ground, then, can it be defended? On scientific grounds surely, for it is one of the records of creation, which it is the object of science to preserve. In our case, let us call it the indulgence of a rational curiosity, which may serve the

useful purpose of training some future Cuvier or Linnæus to enlighten the world; and let us add, we shall endeavour to attain our object harmlessly—"the act shall please we without hurting she"—for we shall deal generously, plunderers though we be, with the feathered owners of the nest.

The preparations for a bird-nesting expedition are few and soon made: a game-bag of some kind, with boxes strong enough to protect the eggs collected from being crushed, lined with cotton-wool or moss.

Once clear of streets and houses, we can hardly go astray. Here is the common; flocks of sparrows harbour in the hedges, keeping up their incessant chatter; a little farther off, linnets and chaffinches; and the lark is already carolling high in the air; the hedge-sparrow also shuffles along; slightly raising and shaking its wings, it hops away very quietly and rapidly, till it gets among the roots of the brambles, where it feels secure. There is a nest in that bush, from which the bird has gone with such a sudden rush; it is a linnet, as you may see by her rapid and undulating flight, which she executes in a curved line by alternate risings and fallings. You want a LINNET'S egg; and as there are only four in the nest, they are fresh. Well, take two of them,—not a very severe case of robbery, and the alarmed mother evidently dreads greater ravages. The nest is very neatly constructed of blades and stalks of grass, mixed with moss and wool, and lined with the fur of various animals, sometimes mixed with thistle-down, the breadth being about four inches. The eggs (fig. 16), of which there are usually five or six, of an oval form, three-quarters of an inch long, and about half an inch in their thickest part, are of bluish white, slightly spotted with brownish grey and red, the spots thickest at the larger end.

It is a gratuitous piece of cruelty to rob the bird of all the eggs, and usually leads to the nest being deserted. It is a still more barbarous practice to shoot these small birds, except when they are wanted for some useful purpose connected with science, or at least with the rational intention of making a collection; and it may be doubted if a jury of birds would accept even that excuse for murdering one of their number.

The YELLOWHAMMER is widely distributed, and especially abundant in wooded districts, although it does not usually select the thicket for nidification; for the nest is usually placed on the ground, under a bush, or among the roots of the willow, overhanging a brook, or among its twigs. The nest is

composed, externally, of coarse grass and twigs, neatly lined with finer grass-fibres and hair of the horse and cow, well matted together. The eggs (fig. 17), four or five in number, are oval in form, of a purplish-white, marked with streaks and a few irregular dots of black, together with some faint purplish-grey markings; their length about ten-twelfths of an inch by eight-twelfths in diameter.

The GREENFINCH, sometimes called the green linnet, is a timid bird, but more easily approached than the linnet. It pairs and builds its nest in April, choosing the roots of a furze bush, a close hawthorn hedge, the lower fork of some bushy shrub, or even the ivy on a tree or wall, for its future habitation. The nest is formed of hypna or other vegetable fibre, which it interweaves neatly with fibrous roots and straws mixed with hair; the external walls are strengthened with slender twigs; and the lining is a mixture of hairs and fibrous roots and wool, felted together; the whole forming a compact, well-constructed nest.

The eggs (fig. 12), from four to six in number, are oval, about three-fourths of an inch in length, a little over half an inch in diameter, of a bluish or purplish white, spotted with purple and grey and blackish brown, more or less streaked with black: two broods are sometimes reared in a season.

The REDPOLE, like its congeners, nestles among the brush-wood of the common, on the margins of streams, in rocky dells; but the nest is not common. Mr. Selby describes it as built in a beech or low tree, and formed of moss and the stalks of dry grass, intermixed with the down of the catkin of the willow, which also forms the lining, a soft and warm receptacle for the eggs and young. The birds brood late in the season, the young ones not being fledged till the end of June. The eggs are four in number, of a pale bluish green, spotted with orange-brown towards the larger end.

Early as we are, the LARK is before us with his matin carol. There it is, rising against the wind, and pouring forth its song without intermission; and there it shoots away to the left, in a wide curve, round the wind as it were, and whirling to the right again before it begins its descent into that cornfield, which it does floating, and with expanded wings. Its note is prolonged and more steady;—now it closes its wings, and down it comes with great rapidity, with the body slightly declining; and now its wild fantasia ceases, as it drops on the ground, after hovering a moment in the air. In the long grass near to the spot where

it has dropped, or very near to it, keen eyes will find its nest; and there it is. Among the young blades of corn, which is its favourite nesting-place, the lark scrapes a hollow in the ground; in pasture-ground or common, it selects a place among the long grass, where it builds a nest of stalks and blades of withered grass, rather loosely put together, lining them with softer and finer fibres. The eggs (fig. 11) are four or five, broadly oval in form, and over three-quarters of an inch in length, by about two-thirds in diameter; they are greenish grey, irregularly freckled with a darker shade of brownish green, most densely at the broader end. The lark usually breeds twice in the season,—in June and September,—and the female sits so closely on her eggs that she has been taken there.

The WOODLARK is smaller than the skylark, while it closely resembles it in other respects; but it is observed to sing while perching on trees and bushes, which the skylark never does. Like the skylark, it may be observed to spring with the dawn from the field or pasture-ground in which it has reposed during the night, ascending perpendicularly, while it pours forth its cheerful song, which is even more melodious than its congener. The nest is generally placed in a cornfield, common, or pasture-ground, near a wood. It is composed of blades of dried grass, loosely put together, lined with finer blades, mixed with hair and wool. The eggs (fig. 10), four or five in number, are smaller than the skylark's, and more elongated, being three-quarters of an inch by four-sixths, of a pale yellowish brown, freckled with umber or greyish brown, with dusky irregular lines at the larger end.

The TITLARK, or meadow-pipit, as it is more commonly called, is universally diffused from one extremity of the island to the other, sometimes perching on bush or tree, more commonly on a wall or stone, reposing at night on dry grass. The nest usually occupies a grassy bank or grassy turf, or is so sunk into the ground as not to be easily observed. It is a neatly-constructed nest, formed of stems and blades of grass, lined with finer kinds and tender fibrous roots and hair. The eggs (fig. 14), four to six in number, are of an oval form, three-fourths of an inch by four-sixths in diameter, varying considerably in colour, but generally of a light grey or brownish white ground, dotted and freckled with a purplish grey, especially at the larger end, where they entirely conceal the lighter ground.

On the verge of the common there is, sometimes, a narrow belt of young timber-trees, with a thick hedge beneath, enclosing a large growth of underwood; on the skirts of the

village green we find, occasionally, a venerable clump of trees; sometimes a great extent of wall or paling incloses some richly-wooded domain, where the trees skirt the highway; or, in default of better accommodation, there is a tall hawthorn hedge. On each and all of these, in many parts of England between the Trent valley and the south coast, the NIGHTINGALE may be heard, night and morning, pouring forth its joyous song from the lower branches. Beyond these limits, the appearance of the nightingale, if not denied, is, at least, rare; for, although it has been frequently heard as far north as York, and, in very mild summers, even in Mid-Lothian, as a rule these are its limits.

When the nest is sought for, keen eyes must be made use of, as the bird displays great sagacity in its concealment, choosing the root of the thickest and most impenetrable hedge for building and placing it, besides which it is completely surrounded by a clump of leaves and bushes similar in colour to those of which it is formed. The foundation of the nest is usually loose grass, rushes, or dry leaves; the walls of the nest, which is large, and loosely put together externally, are a thick matting of leaves of the neighbouring trees, lined with a thin covering of fine grass, and, in many respects, resembling the nest of the robin. Here the nightingale lays its five or six broadish ovate eggs (fig. 9), three-fourths of an inch in length and seven-twelfths in diameter. They are generally of a brown uniform colour, but occasionally slightly mottled all over with reddish-brown spots.





BIRD-NESTING IN WOODS AND HEDGEROWS.

Let the reader imagine the verge of a young plantation of some thirty years' growth, to which memory calls us back after more years than we like to think of. In this plantation, which had been planted by a retired physician, a keen botanist and a lover of science, the rarest trees known eighty years back were intermingled with the ash, the elm, the birch, and a sprinkling of spruce and other pine-trees. A limpid brook, just large enough to ornament the hanging woods and mingle its murmurings with the song of birds, traverses the wood in a meandering course for upwards of a mile, skirted by the once trim and still pleasant walk, although its gravel is now covered with weeds, and its shrubbery a tangled thicket; but all the better for its feathered inhabitants. Crossing the stile and penetrating the thicket, we are landed in a small triangular meadow, through which the brook meanders, after tumbling over

a rugged cascade, worn in the bed of the river into a deep black pool, where a handsome trout may always be found. Here, in the days I speak of, a pair of WATER-OUZELS had built their nest in the crevices of the crumbling rocks which overlooked the pool. The nest is bulky and arched, composed externally of various species of moss, firmly matted together with mud, not unlike the swallow's nest, with an aperture in front, of oblong form, three inches and a half wide by one and a half high. Within this is contained the nest itself, a hemispherical mass of soft grass-moss and water-plants, lined with leaves of trees. The eggs (fig. 27) are five or six in number, of an oval form, and rather pointed, about an inch in length and three-quarters of an inch at their thickest end, and of a cream-coloured white. When these little birds have attached themselves to a locality, they are known to return to it for many years in succession, and the pair in question had built here for several years.

This plantation is so favourably situated in all respects, that every songster of the grove may be found in it. And here, in this high copse, we have a JAY's nest, occupying the lower branches of a young oak. It is formed of sticks, lined with fibrous roots, on which it deposits five or six eggs, broadly oval (fig. 23), of a pale bluish-green or grey colour, obscurely marked with a darker shade of yellowish brown and pale purple, but varying much in colour. The jay is an object of dread to some of the smaller birds; for, although not exactly a bird of prey, opportunity offering, it does not hesitate to attack them, and they shun its neighbourhood accordingly. Mr. Durham Weir, a close observer, whose MS. notes are now before us, "trapped one in January, 1837, which he placed with some other birds in his tool-house; but was astonished to find two of them destroyed in the morning. He soon had proof against their destroyer. A linnet alighting on a branch of a tree on which the jay was sitting, he caught it by the throat with his bill and killed it in a few minutes. Half an hour after, the jay seized upon a green linnet in the same manner, plucked off the feathers, and devoured it bit by bit, all except the head."

The MISSEL-THRUSH has, however, no fears of this showy bird, but builds his nest where he lists, in the forked branch of some low branch of a tree, generally at some inconsiderable height,—the nest, a bulky mass some six inches and a half externally, and three inches and a half internally. The external walls are composed of twigs, straws, and grasses, intermixed

with leaves and mosses, and flattened patches of mud, between three and four inches thick, with a lining of grass and a few large feathers; the mouth firmly constructed of interwoven panicles of hair or grass, mingled with twigs, root-fibres, and wool. In this nest the missel-thrush generally lays three to five eggs, of an oblong-ovate form, an inch and a quarter long, by a little over three-quarters thick (fig. 26), of a purplish-white or flesh colour, marked with blotches of light brown and obscure purplish red.

The song-thrush and blackbird both abound in plantations of this description; but neither of them confine themselves to the woods,—a hedgerow or rough bank with moss, or the roots of a hedge, even a hole in a wall or the crevices of a rock, being selected, occasionally, in localities where there are no plantations. The THRUSH's nest, which is bulky, is composed externally of various kinds of grasses and long tough roots of various plants, tufts of poa and stellaria, mosses, and other substances. Within this is a more elaborate structure of fibrous roots, tufts of straws, and beech leaves, interwoven with clay, or some other binding substance, the whole lined or plastered with a thin compact lining of some substance, supposed to be horse-dung, on the surface of which is a coating of chips of straw and slender grasses. The eggs (fig. 31) vary from four to six, of a broadly ovate shape, and of a bright bluish green, with scattered blackish-brown spots, more thickly placed towards the larger end, measuring about an inch and a sixth in length by ten and a half lines thick.

The nest of the BLACKBIRD is scarcely to be distinguished from that of the thrush, and the locality is nearly the same. The eggs (fig. 32) are also from four to six, of a bluish or grey green, freckled with pale umber-looking or reddish-brown markings, denser towards the thick extremity, where the spots sometimes form a sort of ring, slightly longer than the eggs of the thrush, but of the same thickness.

The FIELDFARE is found in these plantations in great numbers in the season; but they do not breed with us. In a paper in the *Magazine of Botany and Zoology*, on "Birds of Norway," Mr. Hewitson describes them as breeding by hundreds in a very limited space, the nest being placed in the forks of spruce firs, some forty or fifty feet from the ground, the eggs (fig. 29) much resembling those of the blackbird, and being five and six in number.

The REDWING closely resembles the fieldfare in many of its

habits, and especially in its nest and mode of breeding, the egg (fig. 25) being about the size of the blackbird's, of a pale greenish colour, slightly purplish toward the smaller end, with reddish brown spots at the other extremity.

Let us skirt the plantation, and listen to the strains which issue from that sycamore; they are loud, clear, and surpassingly melodious; the notes gush out with rapidity, but always clear and distinct. It is the BLACKCAP warbler, and the nest is not far off,—and there it is, in the fork of that bay-tree. It is composed of dried stalks of the goose or some other grass, woven together with tufts of wool and moss, lined with fibrous roots and long hairs. The eggs (fig. 28) are four or five, of a broadly ovate form, three-quarters of an inch long by seven-twelfths thick, of a greyish-white colour, faintly mottled with purplish grey, with streaks and marks of blackish brown.

A little further on, a clump of wild birch and hazel overhanging the brook gives shelter to a whole colony of the titmice, wrens, redpoles, siskins, and other songsters, whose notes, more or less musical, fill the air with an harmonious hum, as they mingle with the murmurings of the brook and with the harsh *chir-r-r-ik* of the ox-tit, the *twink-twink* of the chaffinch, and the alarm note of the robin and the wren. Here, also, is the more familiar blue-tit, or tomtit, as he is more commonly called, skipping about with a frisking motion, as he peers into every chink and cranny, or behind every leaf, now hanging back downwards, now at the topmost branches, head-feathers erected, and *chur-chur-ing* with his petulant cry.

The TOMTIT is the constant denizen of such localities as this; but in the spring it also makes excursions into the neighbouring gardens, where it is a good friend to the gardener, devouring the larvæ of many an insect which would otherwise destroy his hopes of fruit or flower, although John does not always know it. At this season Tom is noisy and vociferous. The nest is built in the chink of a wall, under the thatched roof, in a hole in the trunk of a tree, or, indeed, in any, even the most unlikely localities. In the manuscript notes of Mr. R. D. Duncan, a good ornithologist and close observer, now before us, is described the nest of a pair which had been built in the shaft of a pump-well, at the bottom of his garden: "Although the nest was drenched and partly carried away every time water was drawn, still they persevered in building there, endeavouring to fix their nest near to the piston. Gladly

would we have suffered them to remain, had they not kept the water in a continually muddy state by the materials they used. After their expulsion from the well, which was not very easily effected, they made choice of a hole in an old wall at the back of the house. One day, when passing the place," he says, "attention was attracted by a loud hissing, somewhat like that emitted by a cat, an adder, or a weasel. On looking at the little crevice in the wall, I soon discovered whence the sound proceeded; there sat the agitated Tom, employing this vociferous method of ridding himself of my presence. The nest was composed first of a layer of mixed moss, grass, and wool, with a lining of hair and feathers. The eggs (fig. 7) were very numerous, but I did not count them—some authors say as many as twenty, of a regular oval form, five-eighths of an inch long, and half an inch thick, white, slightly tinged with red, and marked with irregular spots of darker red. When a family made its appearance in this dwelling, the parent birds were so anxious in supplying the wants of their little ones, that I have frequently stood so near, as the birds entered and left the nest, that I might have caught them by stretching out my hand. In the following year they again attempted to build in the well, renewing their efforts for four successive years."

All the tits are, more or less, birds of a social habit, the ox-tit being the most retiring, as it is the largest; the ox-tit mixing freely, not only with its own species, but with the blue-tit and cole-tit. A cole-tit's nest sent to Dr. Robertson from Perthshire is thus described in a note from that gentleman:—"It is rather loosely constructed, and of considerable size, measuring internally two inches and a quarter, externally four and a quarter. The outer part is composed of chips of decayed wood, small larch-twigs, fibres of various plants, and moss, then a thick layer of finer moss and fibre; the inner layers are more compact, and formed of fibres intermixed internally with downy feathers, the fibre being the softer part of the bark of trees, and of the stems and leaves of herbaceous plants. The eggs (fig. 8), six or eight in number, four-sixths of an inch long, and three-sixths thick, white, thickly dotted with light red spots at the larger end, a few similar spots being scattered over the other parts. The nest is usually constructed in the hollow bole of some tree, or in the crevice of an old wall."

But the most singular of this family is the BOTTLE-TIT, or long-tailed muffin, poke-pudding, or mum-tuffin, and long-tailed mag, to all of which names it hails in different localities.

Except the gold-crested wren, it is the smallest of British birds; at the same time, its frame is nearly buried in a mass of soft and bulky feathers, which are left loose and tufty, so that it seems to be muffled to the chin, the eyes and nostrils being nearly concealed by the bristly feathers at the base of the bill, while the tail is full six inches long. In such spots as we have described, that is, in plantations and straggling birch and hazel woods overhanging a brook, the long-tailed tit flits along the tops of the taller bushes, searching the leaves and twigs, restless and ever in motion, streaming along in undulating and rapid flight, in which it has been compared to a flying arrow or dart, to which its small body and long tail gives it the appearance. The nest has already been described; the foundation is laid in the cleft of a tree, after a careful examination of the situation, and trying the hole they have chosen by flying in and out again several times. The foundation is formed of moss; the walls are built up of small portions of lichens, white and grey, mixed with fine green moss, feathers, and the softer leaves of deciduous trees, intermixed and woven with wool and spider's webs, giving them consistence by pressing the whole with their breast, and by turning themselves round repeatedly in all directions. They are very jealous at first at being watched, but soon get tame and accustomed to the observer; the male bird watching on the branch of a tree, as close to the nest as possible, while the hen bird is building; when she has disposed of her contribution to the nest, the other goes in while she watches: when both have finished, they fly off together to collect materials. Sometimes the nest is placed in the fork of a tree, a long pyriform, six inches long, formed externally of lichens, bound together with blades of grass, downy filaments, and cotton threads, and lined with feathers. In this nest they lay as many as a dozen of the smallest of eggs (fig. 6) of an oval form, rounded at the smaller end, and about half an inch long and five-twelfths broad, of a colour white, marked with numerous faint-red dots at the larger end.

Pursuing our walk, we soon come across the nest of the ROBIN-REDBREAST; for, although Robin is a very domesticated sort of fellow when the snow covers the ground, and even earlier in the season, when the wild flowers have faded and the trees in the woods become bare, and the evenings chilly,—with the first glimpse of spring he disappears from the haunts of men, betaking himself to woods and thickets, where, doubtless, his pert, forward, and pugnacious character does not fail to exhibit

itself. Towards the end of April, and even so early as March in some well-sheltered places, young birds have been found in their nests. Robin is by no means particular where he builds his house; under a hedge or bush, on a mossy bank, in a ditch, even on the ground, but not in tree, shrub, or hedge. It is a bulky nest, rather loosely constructed; in fact, Robin is not so skilful an architect as poets and naturalists have painted him. Its foundations are a layer of moss and decayed leaves of trees, with broad blades of grass, mosses of several species loosely interwoven with a few skeleton leaves; the lining is of hair and wool, a quarter of an inch thick, so that it appears Robin is partial to a soft bed. The eggs (fig. 18) are five or six; they are of a regular oval form, about three-quarters of an inch long and four-sixths broad, of a delicate reddish white or brownish tinge, fading into a brownish white at the small end, and faintly freckled with palish red, the brownish markings sometimes forming a belt there.

In our wood the GOLDFINCH is an habitual resident, but is by no means so plentiful as "in the days when we were young;" for improved agriculture, whose aim is to root out weeds and thistles, from which the smaller birds draw much of their support, has not tended to their increase. They nestle in woods, in orchards, in gardens, and in hedgerows; sometimes in the tops of tall timber-trees. The nest is composed of grass and moss, with an external covering of lichens elaborately interwoven with thread, twigs, and other substances, and lined with wool and hair, the down of various plants, and other delicate filaments, and will be ready for the reception of the young pair by the middle of April, or thereabouts. The eggs (fig. 13) are four or five, about three-fourths of an inch long, and half an inch thick, of a bluish-white, or rather pale bluish-grey colour, sometimes tinged with brown, and marked with a few spots of greyish purple and brown, and occasionally having a dark streak or two.

Having traversed about half of the plantation, we reach a spot where the little river issues from a sort of defile and passes outside the wood, under the retaining wall which supports the pathway. Under the banks of this wall, just on the edge of the wood, at the time I write of, Jenny (English) or Kitty WREN (as the Scotch say) had built her nest, and in trees overhanging it a whole colony of wrens made the woods re-echo again with their incessant roundelays as they flitted from branch to branch, or frisked about among the topmost

boughs, with their chirping and not over melodious note. This becomes a sort of prolonged *chirr*, as you approach nearer, while the bird hops from one bush to another, jerking its tail, which it keeps nearly erect, hopping about with great alacrity, continually uttering its rapid *chit, chit, chirr*:—

“Thou fairy bird, how sweet to trace
The rapid flight of thy tiny race;
For the wild bee scarcely waves its wing
More lightly than thine, thou fairy thing.”

In liveliness and activity, indeed, it rivals all its congeners, which has originated a pleasant little fable among the inhabitants of the distant Hebrides:—“The birds are all assembled, and the eagle is boasting of his strength. He can mount higher in the air than any other of earth’s inhabitants, but is flatly contradicted by the wren, which challenges him, and a trial of their powers ensues. Eyeing his puny rival with great contempt, the majestic eagle spreads his huge wings, in sign of acceptance of the challenge, rises up into the air with rapid gyrations; not so rapidly, however, but that the wren has nimbly perched on the eagle’s back, where it concealed itself among the feathers. Up rose the royal bird, high above the mountain; up beyond those cloudy streaks of grey vapour; up beyond cirri and cirro-cumuli that float in the blue ether; up till he seems a mere point to goshawk and peregrine; up till he is at last compelled to stop for breath, gasping with swollen eyes and palpitating heart; he can rise no farther, and, spreading wide his wings and tail, he floats in the dazzling light; he is satisfied the little vain-glorious thing which had defied him is left a mile behind at least. But lo! up starts the wren from its concealed perch; with a hop and a jerk of its tail, and with a glance of pride, it springs up into the regions, higher still, where it floats for a moment, and sings its song of triumph; it seizes a feather from the eagle’s neck, and descends to receive the prize,—‘for strength is no match for cunning.’” Such at least is the Hebridean moral, as related by Macgillivray.

In this “bosky dell,” just under a mossy bank, which formed a coping to the wall, where a stone had given way, the nest was placed. It was large for so small a bird. Outwardly, it presents the appearance of a mass of decayed vegetable fibre, of an irregularly rounded form; its foundation is a layer of decayed ferns and other plants, herbaceous and woody. The outer wall of the nest is of the same kind of

material, interwoven with mosses of several species, which are fresh and green, curiously interwoven with fibrous roots and hair of various animals; the inner surface is spherical, and smooth as a piece of felt, some three inches in diameter, and it is arched over with fern leaves and straws. To the height of two inches there is a lining of soft large feathers, chiefly pheasants and wood-pigeons' with a mixture of ducks' feathers. The oblong aperture in front is low and arched, two inches wide by one and a half in height; its lower edge formed of slender twigs, herbaceous stalks and grasses, the filling or plastering being "made good," as a workman would say, in a very workmanlike manner.

Some wren's nests are without the internal layers, and entirely of the hypna moss, others have the lining of the feathers of the domestic fowl; and far away from human habitations, in the wild glens of the Grampians, the nest is found, in some rocky chink, in which an Alpine torrent flows between rough heathery banks, with overhanging blueberry twigs. Nor does the wren disdain altogether the haunts of men for its nest: a hole in a wall, in the thatched roof, in a tree, in an ivy-covered wall; in fact, it is not capricious in its choice, but readily adapts itself to circumstances.

The eggs (fig. 15), five or six in number, are extremely delicate and pretty, of a rounded oval form, four-sixths of an inch in length and half an inch in thickness; pure white, with some scattered dots and streaks of light red at the larger end, but varying in number of dots in different eggs even of the same nest.

The CHAFFINCH is a constant resident on the skirts of such plantations as we have been describing; avoiding the depths of the woods, and especially fir-plantations, orchards, and hedgerows,—the outskirts of copses and groves are its most favoured haunts. In the fork of a shrub, often on a tall tree, on the ivy-covered wall, or in a thick hawthorn hedge, its nest will frequently be found. Externally, it is composed of moss, covered with ashy-coloured lichens and interwoven with hairs and woolly fibres; its interior is lined with feathers, mixed with cow and horse's hairs, and the seed-down of such plants as the thistle.

The eggs (fig. 1) are four or five in number, of a regular oval form, about three-fourths of an inch long and half an inch thick, of a purplish-white or rather a reddish-grey colour, slightly spotted with reddish brown, with a few irregular lines of the same hue.

The **HAWFINCH**, or grasbeak, is becoming a rare bird in this country, being shot down by collectors for stuffing wherever it is seen, and naturalists have expressed great doubts of its breeding in this island. It has, however, been not unfrequently found of late years in the hornbeam pollards of Epping Forest, and also in Lord Clifden's grounds at Roehampton, where two nests were seen in 1835. The nest was built at the extremity of the branch of a horse-chestnut tree, near the lodge, and was composed chiefly of the twigs of privet and birch, and lined with hair and fine grass; the nest is shallow, and the twigs loosely put together.

The eggs (fig. 2) are three to five, of an ashy-grey colour, tinged with green, and marked with brown spots and bluish-black lines.

The nest of the **BULLFINCH** is found in similar localities, but later in the season; about the beginning of May it begins to build its nest, being a loosely-formed fabric of dry twigs, placed at no great height on the fork of a spruce-fir tree, or hawthorn-bush, lining it with fibrous roots of small plants. It is a denizen of the woods, and rarely found where roots are absent, for it lives the greater part of the year in thickets and hedges, only betaking itself to the fields in search of seeds, and to the gardens in search of the seeds of flowers and fruits. The eggs (fig. 4), four or five in number, are of a broadish oval form, of bluish or purplish-white colour, spotted and streaked with purplish grey and reddish brown, about three-quarters of an inch long and a little over half an inch in greatest width. The bird is remarkable for its undulating flight, occasionally protracted, as it flits along from the hedges and roads; it is an active, lively bird.

The **SISKIN**, while it is found among us in considerable numbers, does not seem to breed south of the Tweed; at least none of our naturalists have recorded more than an occasional pair. Macgillivray and his correspondents were more fortunate; Mr. Weir, of Boghead, having observed the small nest of a pair built in the fork of a spruce fir. It was built on a branch, about four feet and a half from the ground, one side resting against the stem, and one of the best concealed nests he had seen. The nest is cup-shaped, with walls an inch and a half thick, and the interior of the nest an inch and a quarter in diameter, formed, externally, of hypna moss, held together by hairs and fibrous roots interwoven; the edges interlaced with grass and root fibre; the lining, half an inch thick, formed of seed-down and hairs densely matted together.

The eggs of the siskin (fig. 3) are five or six in number, of an oval shape, five-eighths of an inch in length and half an inch in breadth. They vary considerably in their colour and markings, but the prevailing colour is a pale bluish-white, shaded at the thick end with purple and a few reddish-brown dots.

ROCK AND WALL-BUILDING BIRDS.

There are some birds whose breeding-places are neither woods nor commons, but wild rocky places, old ruins, walls near dwelling-places, and lofty trees near to houses. Most of the falcons and the raven belong to the first of these; jackdaws and owls belong to the second; starlings, redwings, sometimes the robin and the whitethroat, belong to the third; the magpies and others of their congeners to the fourth.

A vision of the past rising before us, presents the ruins of an old sixteenth-century castle, with pointed turrets; the ancient "pleasaunce" has returned to a state of nature, overgrown with thickets; a grove of ancient plane-trees, of the largest dimensions, occupy one of its sides. The castle is the haunt of the barn-owl, the jackdaw, and a colony of pigeons, which have almost become wild from the deserted state of the place. Among the trees a colony of magpies had established their home, as long as we can remember, and many a fruitless effort had been made to scale the trees, but their girth was all too large and the branches too high for tiny limbs to accomplish the adventure. In the mean time, from this vantage-ground, Mag, watching her opportunity, had pounced upon and carried off to her castle many a young chicken, almost from beneath their owner's eye. At length the depredations could no longer be borne; a war of extermination was declared, which only terminated when the last of the magpies was destroyed.

The nest of the MAGPIE has been described at page 293. The eggs (fig. 20), from four to six, although differing greatly, are generally oval in form, an inch and a half long, rather pointed, and about an inch in diameter. They are frequently of a pale green, freckled all over with brown and purple, rather a dusky looking egg, but handsomely shaped.

The JACKDAW as well as the owl was a constant inhabitant in the ruins we have indicated. The former's nest is built in some dark recess, but generally beyond the reach of the curious, under

some projecting coping or ancient waterspout. On a foundation of sticks a quantity of straw is laid, and a lining of feathers and other softer materials; here are deposited from four to seven eggs (fig. 22), of a broadly oval form, an inch and a half long and an inch in diameter, of a pale greenish blue or bluish white, with small round spots of dark brown or purple at the larger end, laid about the middle of May.

The JER-FALCON never having been known to breed in this country, its nest is only known to us by description, and the eggs by imported specimens; they are, in size and shape, like those of the domestic fowl, of a reddish brown, dashed over with irregular markings and spots of a darker shade. The peregrine falcon is becoming very rare with us, but breeds on many parts of our shelving rocky coasts, from the Isle of Wight to the Murray Frith, and at many intermediate stations. It is by no means particular as to its nest, and very commonly appropriates one deserted by the raven, or some other bird, in which it lays its three or four eggs, of a deeper reddish brown than the jer-falcon; two inches and an eighth in length, by an inch and three-quarters in diameter, blotched with a deeper brown and in larger blotches than the former.

The elegant *Falco Æsalon*, or MERLIN, haunts the heaths and moors which abound in the North of England and in Scotland. Some authors say it builds a nest of sticks externally, thickly lined with wool, in the pine woods of Norway, which is at variance with the habits of the bird, as far as is known in this country, where it lays its four or five eggs in a hollow in the ground, without further preparation. Of the same reddish-brown with those of the peregrine and jer-falcon, but without the blotches, being slightly dotted over with greenish-black spots, the egg is about an inch and a half in length by an inch and a quarter in diameter.

The KESTREL, which is the only falcon's egg our space permits us to illustrate, is more widely diffused, and better known than any of the other hawks. Breeding in rocks, in some old crumbling ruins, or in the trunks of hollow trees, and generally appropriating the deserted nest of the jackdaw or the magpie, it lays four eggs (fig. 19), smaller than any of those previously described, being only an inch and a half long and an inch and a quarter in breadth, but strongly resembling that of the peregrine falcon in colour and markings. The eggs vary from three to five, are of a broadly elliptical or roundish shape, of a pale reddish-orange, patched all over

with a dull brownish-red. The GOSHAWK has the largest egg of all the falcons, being in shape and colour as well as size very much like that of the common duck; it is scarce with us, but common in the North of Scotland, breeding, as Mr. Low informs us, on the rocks of the sea-coast, on the rocky Grampians, and on the wooded banks of the Dee. In the forests of Germany it builds in a high tree on the outskirts of the forest, laying three or four eggs of a bluish-white colour, two inches and a quarter in length by an inch and a quarter in diameter, and without spots.

The egg of the SPARROW-HAWK is the most marked of all the falcons' eggs, but remarkable also for its variations; it forms a roundish oval, an inch and four-eighths long by an inch and three-eighths broad, of an ashy-grey colour, covered at the larger end with brown blotches and streaks. The sparrow-hawk is most frequently found to appropriate the deserted nest of a crow or magpie. Sometimes the eggs are found on the ledge of a rock or some lofty cliff. Mr. Selby says it also builds a shallow nest in some low tree or thorn-bush, the material used being slender twigs, on which it lays.

The OWLS make little preparation in the way of nests; a hollow in the ground, lined with the compressed castings of the birds, or a similar accommodation in the hollow of some tree,—the ledge of a rock or a hole in the wall of some ghostly ruin, seems all the preparation to which they have recourse; on this bed, sometimes so shallow that the wind would seem able to roll their eggs away, the owls lay their two or three eggs, which vary much, both in size and shape, but are almost invariably of one colour; a whitish blue, without spots, some of them round, others oval, more or less acute.

He who would find the nest of the RAVEN must now follow him far from the abode of men, scale the rocky cliffs of the seashore, or the shelving rocks of remote hilly countries, the centre of a grove, or some ancient oak; for persecution has driven this "bird of evil omen," as it is sometimes considered, away from its old haunts, the ruined tower or ancient steeple. Sometimes, however, it is still known to build its nest in some lofty tree, and if left undisturbed it will return successively for many years, refurnishing its nest annually with a lining of the fur of the rabbit and other animals. The nest is large, composed of a foundation of sticks crossed and plastered together with clay, with a lining first of fibrous roots, and inside a carpet of fur, wool, or hair. The eggs (fig. 21) are four, five,

or six in number, two inches in length and an inch and five-twelfths in diameter, of a dirty greenish brown, with thick blotches on the larger end, but with several important variations, from a greenish grey with streaks of reddish brown, up to greenish brown in different eggs.

The STARLING builds its nest early in May or towards the end of April, in the crevices of rocks, in caverns, in holes under grassy banks, in holes in a wall, or in the trunk of trees. It is a bulky structure, composed of grass and other plants, with a rough lining of hair and feathers. The eggs (fig. 24) are five or six, of an elongated oval form, of a delicate feeble greenish blue, and about an inch and a quarter long by three-quarters in diameter.

The REDSTART, like the starling, places its nest in the cavity of a wall or the trunk of a tree, in the chink of a rock, or among stones. The nest is bulky, composed of fibrous roots and moss, plentifully lined with hair and feathers; the eggs, six or seven, of an oval form, three-quarters of an inch long by half an inch in diameter, and of a light greenish-blue, and the favourite locality which it affects for nidification is the old wall of a garden.

The RING-OUZEL, on its arrival in April, betakes itself to the open hilly country, sheltering itself in the furze and juniper bushes, if within its reach, in preference to any other. In this situation its nest is usually found; sometimes also under the face of a rough bank or in fragments of rock. It is composed of rough coarse grass, plastered internally with mud and lined with finer grasses. The eggs (fig. 30) are from four to six, of an oval form, about an inch long by over three-quarters in diameter, of a pale bluish green, freckled all over with pale brown.

The red-backed shrike BUTCHER-BIRD, or fly-catcher, as this bird is sometimes called, is common enough round London, and in the western counties, especially among the orchards of Gloucestershire. It frequents the margins of woods, thickets, and tall hedgerows, furze-covered commons, and open downs in the north as well as the south, being, in fact, very widely diffused. About the middle of May,

When buttercups and daisies deck the ground,
And blackbirds whistle clear,

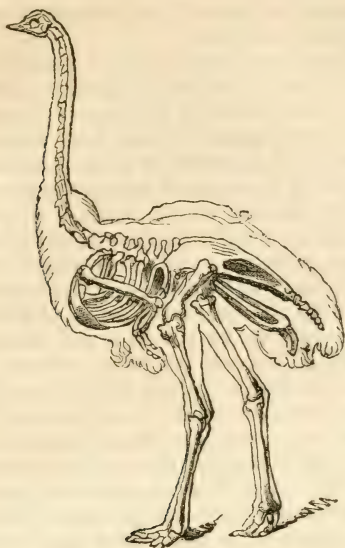
by the borders of some grassy meadow, ere the oak or the ash have yet unfolded their buds, when the apple-blossom and the

pink-eyed florets of hawthorn rival each other in the hedgerows, the sparrow-like note of the shrike may be heard, and the bold black head seen, as he perches, sentinel-like, on some twig or spray. The nest is also found in some shady locality, —a large mass of twigs on the outside, with fibrous roots of plants and green moss, with an internal lining of hair, put together in a somewhat slovenly manner, not very unlike the nest of the missel-thrush, is the butcher-bird's performance.

In this nest the red shrike lays four or five eggs, of an oval shape, about an inch in length by about five-eighths in breadth, of a reddish white, covered with brown spots, which form a band round it at the thick part.

The nest is sometimes selected to receive the egg of the cuckoo, and the bird even bestows its paternal care on the young cuckoo when hatched. In the *Linnean Transactions* for 1861, a paper states that a pair of red shrikes were observed feeding a young cuckoo which was perched on the branch of an oak, a fact which has been confirmed by Temminck, who says that the cuckoo will sometimes lay its egg in the nest of this bird.





SKELETON OF THE OSTRICH.

PREPARING AND STUFFING ANIMALS.

THE art of preserving objects of natural history, to which the name of taxidermy is sometimes given, from the Greek word implying the arrangement of skins, is of French origin and of recent date, probably not later than the present century; the more ancient collections, including the celebrated one of Réaumur, having been only a simple collection of dried skins suspended on the walls of the saloon. The Germans appear to have been the inventors of a mode of preparing and setting up birds by placing feather over feather upon paper so as to imitate nature; but they were very imperfect imitations, scarcely conveying an idea of the bird represented. In our day the taxidermist rivals Nature herself, studying the passions as well as the attitude and shape of the object he wishes to preserve. At the same time he has, by the use of scentless disinfectants, overcome much of the disagreeable smell which

formerly rendered a collection of preserved animal forms so offensive in a private house.

Looking back, then, for about 200 years, we come to the age when the germ of the art of taxidermy was practised by Réaumur. In the cabinet of this learned Frenchman the first traces of taxidermy seem to have been found as now practised, although it was in truth of a most imperfect kind. The ideas of Réaumur were caught up and described by Manduyt. The letters of Kuckau on the method of embalming birds succeeded. Several zealous disciples followed, and in 1797 the Abbé Manesse published a method of collecting and arranging animals, and preserving their skins. The poisons and aromatic products were the materials he employed at first, but he afterwards abandoned these for the acids and alkalis. Daudin, in his "Ornithology," quotes all these processes, and adds to them those of Dufresne. About 1801, Nicolas published his method of preserving animals of all kinds, for which he made use of a paste or pomade consisting of camphor, potash, alum, oil of petral, and a kind of liquor which had the property of tanning the skin. But these preservatives, and many others, have been superseded by the composition of Bécœur,* which is the only one employed in the present day, especially for large animals.

The art of preparing and stuffing any animal is one of great simplicity, but requiring clever manipulation, good taste, and habits of observation so as to note the attitude assumed by the different animals. Every one can, with a very little preparation, be made to perform the process; but this is not sufficient; as in painting and other fine arts, so there is an immense gulf between the mere mechanical process by which a bird or animal is set up and mounted, and another in which the exact form and attitude is imitated, and the divers colours which ornament it are preserved. In order to imitate its attitude, the manners and habits of the species must be

* The arsenical soap prepared by Bécœur was as follows:—Five ounces of camphor, two pounds of arsenic (in powder), two pounds of white soap, four ounces of white chalk (in powder), and two ounces of salt of tartar. Mix the ingredients by melting the soap, previously cut into thin slices, in a pipkin, with water, and over a gentle fire. When melted, add the salt of tartar and chalk, and withdraw the pipkin from the fire; now add the arsenic, stirring it in by degrees with a wooden spatula; then, having reduced the camphor to a powder in a mortar, add it to the mixture, and stir till thoroughly incorporated, adding spirits of wine, till it is of the consistence of a thick paste; pour it into jars, and cover, when cool, with a bladder, and put it away for use, marking it "Poison."

studied profoundly ; not less so, indeed, than is required from the painter ; and he who would succeed in the art of mounting animals, must have something nearly approximating to the painter in his powers of observation and representation.

Some writers have attempted to reduce the various attitudes assumed by animals to a rule. Conventional arrangements of this nature have no counterpart in nature, and must result in abortions outrageous to good taste. There is only one rule to be followed by those who would follow and represent nature. Study the habits of your model, and understand well the anatomy of the animal to be reproduced. Then only can you hope to impress the natural and life-like character which really belongs to it.

The means of preserving the skins of vertebrated animals from insects is now pretty well understood. The *Memoirs of Duhamel, Pinel, Chaptal*, and some others, possess information of great value. To these Dupont has added his own practice, to which Swainson, the Bowditches, the late Captain Brown, and Mr. Waterton, and some of their more humble practical followers, as the Gardeners, Wilson, Cooke, and some others, have scarcely left anything undiscovered. And now taxidermy, in the hands of many men of great ability and observation, has reached a point of great perfection.

I must not forget, in my enumeration of artists, the admirable collection of life-like animals which ornamented the German section of the Great Exhibition of 1851. Those remarkable specimens of the taxidermist's art were exhibited by H. Ploucquet, of Stuttgart, and represented a boar-hunt and a stag-hunt of the natural size, and the same in miniature ; groups and nests of different birds of prey ; several hawks pouncing upon their prey ; numerous groups, in which stuffed animals are made to imitate the attitudes and actions of men, with such an expression of comic intelligence as will not soon be forgotten by the spectators who gave their attention to the subject. They were, perhaps, the most beautiful specimens of the art ever produced ; at the same time, the mirth-exciting groups owed quite as much to the comic invention of the artist as to the taxidermist's art.

It is almost impossible to estimate the extent to which a taste for natural history has been promoted by this art ; for if, at first, curiosity has been the chief motive which led to its pursuit, that motive has been inevitably followed by a higher one, namely, the study of the habits and actions of animals, which

leads to other habits of observation; and many a collection commenced from motives of mere curiosity, as it increased in extent, has of necessity led more or less to the study of comparative anatomy. The art which brought the facts together, and which necessarily leads to analysis, conducts insensibly to synthesis—to tracing effects to their cause. Even the capture of the animals makes the collector acquainted with the peculiar habits of different species. The chase makes him acquainted with the instinctive shifts by which animals of all kinds evade their pursuers.

HINTS TO TRAVELLERS.

An internal decay, named putrefaction, tending to separate, and resolve the components of the body to its elements, attends all animal and vegetable substances immediately after the vital principle ceases; and unless this tendency to decay is counteracted, the form and characteristics of these bodies would soon become valueless, either for the investigations of science or as the objects of a rational curiosity. There are various processes by which this is accomplished. In the case of birds, and most animals, this is done by removing the skin and drying it, after purifying it by preservatives. Others, as serpents and smooth-skinned animals, are preserved by being plunged in liquids which have the power of checking this tendency to decomposition.

Water dissolves divers parts of certain bodies, not by checking decomposition, but, on the contrary, by accelerating it in some cases. Water charged with alum acts as a preservative on skins of animal fibre, but in so weak a manner that it cannot be relied on for any constant results, especially when the skin is charged with common salt; its use is limited to fruits, which it will preserve for some time. The spirits of turpentine, sometimes employed, damages the tissues, and has a tendency to become thick and viscous, and should be avoided. Oil may preserve some animals, as mollusks and certain fish. Sea-salt, or muriate of sodium, presents no advantages as a preservative; it alters both the form and colour of objects submitted to its influence. Some fishes with very thick and hard skins are subjected to it with advantage; however, in such cases it should be frequently changed and fresh salt added. Employed with care, it may be used when arsenical

soap or paste cannot be obtained in sufficient abundance. A solution of the finest table-salt in water is even recommended by some as a substitute for alcohol; but it is doubtful if this has been yet sufficiently tested. Corrosive sublimate has been proscribed by Péron, the French naturalist, who enumerates its defects; but, carefully employed, and taking proper precautions to avoid its poisonous effects, it is highly effective in a variety of cases. The sublimate salt operates as a rapid, enduring, and energetic desiccating medium, reacting powerfully upon all animal matter, modifying its character in a peculiar manner, and rendering the matter subjected to it unalterable when it has been sufficiently saturated. Exposed in the open air, it facilitates drying and prevents the slightest movement towards decomposition in the skins. The sublimate seems to combine entirely with the air; the liquor, which contains only a weak proportion of this very insoluble salt, is soon exhausted unless the precaution is taken to add fresh sublimate from time to time, as the process of saturation goes on. Finally, when the skins will no longer absorb the liquor, the preservative process is complete; they are then laid out to dry.

But the medium for preserving on which we may rely most securely is alcoholic liquors, especially brandy or spirit distilled from the vine. Arrack, rum, and spirits distilled from grain, while they serve the purpose, are less adapted for zoological preparations than the spirits obtained from the vine; and where it is necessary to employ the alcohol of the country, the most highly rectified spirit will be found best adapted to the purpose. Nevertheless, alcohol has the disadvantage of deteriorating the tissues as well as disfiguring them, and the strength of the liquor should be reduced in order to avoid this. The more perfect the transparency of the liquor the better is it adapted for the purpose. Pure alcohol destroys the colour of animals immersed in it; much concentrated, it destroys the animal tissues. Alcohol united with acids has been very successful, when diluted with water. For larger animals, however, the strongest alcohol may be used. In the absence of pure alcohol or spirits of wine, add to the spirits of the country some dissolved camphor, which, without adding to the strength of the liquor, is found to be sufficient for the preservation of most animals; while the camphor protects the colours from change. A mixture in the proportion of two parts distilled water and one part alcohol, adding two ounces of sulphate of aluminum to every quart of the liquid, is recom-

mended; but the liquor prepared by M. Guyot, having a high reputation in France, is made as follows:—Take twenty pints of the best Cognac brandy, and withdraw by distillation five pints; add to what remains equal parts of well water and a pound of the green flowers of lavender, and again distil them to dryness. This done, take twelve parts of the spirits of wine which has been distilled. Mix them with sixty-nine pints of well water, and add to the mixture equal parts of the liquid furnished by distillation. This is the Guyot preserving fluid, which is perfectly pure and limpid, and of a bitter taste and slightly aromatic smell, containing only one part of alcohol to thirty of water. Monro adds small doses of nitric or muriatic acid to this liquor. Ruysch used spirits of wine distilled with the black powder of cardamine and camphor.

Before immersing objects of natural history in this liquid, they should be carefully washed in many baths of pure water at a moderate temperature, more especially all marine animals and crustacea, which would be destroyed without this precaution. When immersed they require to be watched, and the liquor rendered weaker or stronger, as may be required.

“The spirituous liquor,” says Dufresne, “is still preferable to all other modes of preservation.” We recommend to travelers to put into the spirit all the fish they preserve; but let us indicate the precaution to be taken for their transport. In long voyages furnish yourself with little barrels, holding from thirty to sixty pints, with iron hoops. At one of the ends make a species of valve, with a bevel about six inches long, fill the cask with the liquor to about two-thirds. When you have a fish to preserve, and having taken note of all connected with it, roll it up in a piece of linen and tie it, attaching to it a piece of wood on which a figure has been carved corresponding with that in the note-book, and plunge it into the liquor through the valve, which is again hermetically closed. Should the fish show by the swelling ovarium that she is full of eggs, they should be removed by an incision in the anus, plunging the knife towards the anterior part of the ventre, and extracting the eggs, which would soon escape, and reduce the liquor below the required strength, if left in the fish.

As a layer of fish is deposited in the barrel, a layer of cotton should follow, so as to prevent them from shaking with the motion of the ship. The barrel should not contain more than two-thirds of fish, the remainder being made up with cotton and liquor.

PROCURING SUBJECTS.

The preservation of serpents requires still fewer accessories. Smaller species are usually plunged at once into a bottle of spirits, previously making a cut in the abdomen, by means of which the spirits can be introduced so as to preserve the intestines from decay. In the larger species skinning becomes necessary, when great care is required to avoid injury to the scales, as much as must be taken with the tails of lizards. The head also requires some care, being the most valuable characteristic of its zoological character.

PROCURING SUBJECTS.

He who would be his own procurator as well as his own curator must rise with the sun, or, rather, before it. The equipment required, supposing the locality fixed upon to be within walking distance, is a warm rough coat, which is not too cumbersome and which will not be damaged by brushing through the underwood, for the objects of our search lie in the depth of the woods; strong boots and leather gaiters, for he will have to dash the early dew from many a blade of grass; a game-bag well furnished with inside-pockets, in which the smaller birds or animals may be placed when secured, and subjected to such necessary preparation as can be bestowed on them on the spot. Besides these, a box or boxes in which such eggs as fall in his way can be deposited.

He has next to provide himself with a gun,—that indispensable object of the fowler's occupation. My own practice is to keep a gun at two or three farmhouses in the country where I am known, choosing the best localities I can conveniently select, and when I require specimens or my leisure permits, I can either slip down by a very late or very early train, and be on the ground I have selected by early dawn. My gun is a double-barrel, 13 bore. I load one barrel with two drachms of the best powder and an ounce and a half of No. 8 shot; the other with the same quantity of powder and No. 6 shot. I am thus prepared for whatever may turn up: with the smaller shot I can bring down any of the smaller birds without injury to the plumage, and should any of the larger kinds come in my way, I am also prepared for them—advantages which are obviously unattainable with a single barrel; for, to shoot a small bird with the larger shot would be to tear it all to pieces, and render it quite unfit for stuffing. The bird being shot, I

have found by experience that it is best to let it lie until the blood round the wound has coagulated, and then, carefully pulling the surrounding feathers on one side, I remove it with a penknife, put a little cotton-wool into the wound and also into the mouth. After this I smooth down the feathers, wrap it carefully in a sheet of soft paper, and place it in one of the pockets of my knapsack, while I pursue my sport.

I am quite aware that some fowlers prefer the smaller dust-shot; and for some of our more delicate birds, as the golden-crested wren, the bottle-tit, and some others even in our own country, and the humming-birds of the tropics, I believe that the concussion of the powder and wadding is enough to bring them down. But I think less damage arises from No. 8 than even the smaller shot, inasmuch as the latter is thrown in a denser mass against the bird, and does infinitely more damage to the plumage.

Having provided himself with the necessary appliances of his intended sport, the young naturalist has next to consider the character of the object of his pursuit. All animals have their assigned place in creation. Some are only to be found in the corn-fields; others haunt the woods; while others again abound in rocky and mountainous districts, on the sea-shore, or on the river's bank; and he who has set his mind on any particular object must acquaint himself with the locality which it affects most. It is equally indispensable to know the best season for its capture or destruction; that is, the season when its fur or plumage is brightest, or when the skin is in the most proper state for preservation. Nor is it unimportant, in anticipation of a successful search, to know the hour of the day at which it is abroad. It has been attempted to construct a floral time-piece; another might be constructed of greater exactness, calculated upon the basis of the regularity with which animals pursue their avocations: some creatures are only abroad at noon-day; others, like the lark, are abroad with the dawn. At night the nightingale becomes the most prominent songster of the grove:—

“ An April night
Would be too short for him to utter forth
His love-chant, and disburden his full soul
Of all its music ! ”

Accordingly it is pretty well established that the nightingale, if it does not sing all night, sings late in the summer evening and early in the dawn. Farther on in the night the owl is

heard—haunter of ancient ruins—he flits about with melancholy, sepulchral sounds, with his Too-who, too-who!—fitting sounds for the “ivy-mantled tower,” his usual abode. Some knowledge of the animal or bird which is to be the object of pursuit is thus indispensable. In the season of reproduction, when incubation has made some advance, it would be both wicked and cruel to destroy the female. Again, in the moulting season it would be waste of time as well as cruelty to attack them. The best season, perhaps, is the early pairing season: the plumage or fur is then most brilliant; the migratory species have recovered from the effects of their long journey, and their lives are redolent of hope and joy. It is, perhaps, a piece of cruelty to intercept so much happiness; but then how are collections to be made without exposing collectors to the charge? In my own experience I have found the best localities to be some one or other of those long green lanes, between high hedgerows, which form the charm of our rural scenery. If an occasional clump of young plantations intervene, there will be found the titmouse, chaffinch, yellowhammer, and most of our songsters, in great abundance; and should there be a watercourse by the side of the hedgerow, blackbirds and thrushes will be found. For larks you must look in the open grassy fields, or among the waving corn in summer; in winter they nestle and shelter themselves under the broad leaf of the turnip and other green crops.

Magpies, jays, woodpeckers, and the wood-pigeon haunt the more densely-wooded districts; and there also must the owls and the falcon tribes, which breed with us, be sought. Rooks, as is well known, affect some ancient grove near some ancestral home, the loftiest branches of which they colonize, hundreds of them together; whilst the carrion crow, often confounded with the rooks, builds in some solitary tree in a hedgerow. Starlings are found in short decayed trees and deserted towers, when not assembled in flocks. I have a kindly recollection of one of these amusing birds which I once possessed. His usual morning’s salutation to me was a “Good morning, sir. Pretty creature. Jacob’s mistress pretty creature,”—Jacob being his own name. He would then imitate the canary so closely as to render it nearly impossible to distinguish one from the other in the lower notes.

The haunts of the moor-fowl, datchick, and coot, and other fresh-water birds, are, of course, widely different from these localities. Among the flags and reeds by the river-side their

nests will be found. There also the reed-warblers build a nest, which they suspend by means of a glutinous clay to the stumps of four reeds, adjusted to it so exactly, that while it almost touches the water, the most boisterous wind rarely immerses it. The water-ouzel builds a nest and lives in it under some old mossy bank overhanging the water of some running stream, and in similar situations the kingfishers are found to nestle under the bank—sometimes in the hole of a water-rat.

Nests and eggs are somewhat foreign to my present pursuit, but I cannot avoid giving a word of advice on this subject. Both are important accessories to mounting birds, and I find great advantage in using the real nest and eggs in that way; unfortunately the nests are generally too bulky to be easily moved. I find the most convenient way of preserving the nest is to wrap cotton round it until I get home. As for the eggs, I dispose of them for the moment in round wooden boxes filled with cotton-wool, which I provide myself with for the purpose. On reaching home, I take the eggs and bore a small hole at each end with a small drill, which I make myself by filing a piece of wire to four square sides, and then to a sharp point; having drilled a hole with this point, I blow out the contents of the egg with a small pointed blow-pipe and place a label over the hole containing the name of the bird. I recommend the young collector to do what I did.—place the eggs back in the nest until he gets perfectly acquainted with it. In this manner I preserved, and made myself acquainted with a large collection of good eggs.

While on this subject I may mention some of the various places in which many birds construct their nests, so that the learner may have some idea where to look for such birds or eggs as he may require. The kestrel and sparrow-hawk usually build in trees in woods, or they take the deserted nest of a rook or crow; owls, woodpeckers, titmice, wrynecks, nuthatches, and starlings, frequently build in the hollows of old trees; blackbirds and thrushes in old stumps, a little above a bank near to some watercourse; nightingales nestle among the dead leaves at the bottom of a thick hedge, requiring sharp eyes to distinguish them from the mass of leaves; the missel-thrush, or storm-cock, as he is sometimes called, chaffinches, goldfinches, and greenfinches, build in orchards, near dwelling-houses; while the larger falcons and eagles build on precipitous and nearly inaccessible rocks.

The kind of cabinet I would recommend for eggs is a stout

case, three feet high, a foot and a half wide, and a foot deep, the four top drawers two inches deep, with twenty-seven divisions for eggs, the fifth drawer three inches deep, with forty-five divisions, the bottom drawer four and a half inches deep, with six divisions: in all making nine drawers. A small piece of wadding should be put into each compartment, to keep the eggs from contact with the wood, and cracking. I have already said that winter is a good season for procuring birds in fine plumage.

On the approach of winter those birds that remain the whole year with us assume their thick wintry garb; but except in very severe weather most animals are difficult to discover at this season. The animals which hybernate have now sought refuge in their holes; the mice and reptiles are concealed in the bosom of the rocks and crevices of walls; nature has sealed up in her frozen caves the fish and other inhabitants of the deep. The season of love, therefore, is the most favourable one for the naturalist, as the moulting season is the worst. The sexes have then assumed the nuptial robe. They are more easily approached at that season also; there is, therefore, reasonable hopes of a successful expedition.

With the exception of the hare, fox, and rabbit, there are hardly any of the mammiferæ of this country on which it is necessary to hunt with the gun; and to shoot a fox is, in most English counties, a high crime against the social laws. But if Reynard is wanted he must be found. His den is in hilly countries crowned with copse wood, over the bank of some stream or under a bank of furze, and, ten to one, if there is a retired hen-roost within a reasonable distance of it, he will not require to be sought, but may be met prowling about it half way, at early dawn; in this case he is fair game, at least to the naturalist who wants a specimen! We need hardly tell where a hare or rabbit is to be found; in a corn or turnip field, or in young plantations and grass meadows, they will be found gambolling about at early dawn, from September to March, after which they are sacred till the season rolls round again. Mice, rats, weasels, and other mammiferæ, may be taken in traps, or destroyed in many ways when found. Some of them, however, as the weasel, are difficult to find when wanted. It is generally during the night or evening such creatures venture abroad.

There are a few precautions to be taken with skins of animals. To prevent damage to the fur large shot is used, as we have seen. Spots of blood may be washed from the fur either

before or after skinning, and generally the same steps may be recommended for the feathers of birds.

It sometimes happens that after death a viscous humour issues from the beak and nostrils, moistening and injuring the head feathers. It also happens that some of the birds of prey, and certain water-birds, will disgorge portions of the food which remains undigested in the crop, and this is calculated to damage their plumage. To prevent these accidents, the fowler, as soon as the bird falls, should either proceed to arrest the flow of blood, or leave it to congeal, and then proceed to stuff the beak with cotton, and tie the upper and lower mandibles together by means of a thread, the object being to prevent the plumage from being soiled by any evacuations whatever. After this, if the bird is a large one, dispose of it in such a manner that the feathers are not disturbed; if, on the contrary, it is small or of middle size, and delicate plumage, slip it head foremost into a paper bag, or cornet, such as grocers use for small packages, and place it in the pockets or boxes in the bag. Birds taken in the snare require the same care; they are easily killed by pressing the sides of the breast opposite the heart, or even the throat, between the finger and thumb, and placing them in the paper-bag when dead.

Birds taken by means of limed twigs generally have the plumage much soiled by the bird-lime, which it is necessary to remove before it gets hard. It is removed by using a little fresh butter or olive-oil, rubbed on the feathers. When the lime and the butter are thoroughly mixed—which is indicated by the lime losing its adhesive power—scrape the feathers one by one with the edge of a scalpel, or knife, until every particle of the grease is removed, when it may be washed with water containing a strong solution of potash, and finally with pure water, drying them by dusting plaster of Paris over them. Soap lees or sulphuric ether are better adapted for washing feathers impregnated with fatty matter.

One thing the naturalist fowler should not forget is to note the colour of the eyes of the animal, in order to replace them in the stuffed specimens; for all species confined in cages lose part of their natural colours in confinement, and present little of the freshness either of eye or plumage which distinguishes the wild animal.

REPTILES are chiefly to be sought for in May and June; in these months they have generally just changed their skin. They require less care than either of the preceding class of animals,

as the glossy skin which covers them requires fewer precautions for its preservation. The species which can be captured with least injury, as the chelonians, or tortoises, have their softer parts protected by a special organization or shell. It is otherwise with the saurians and ophidians, or lizards and serpents. Here, to real danger in the pursuit, is added the difficulty of taking them without injuring the external skin. In the lizards, for example, especially those of small size, the skin is so delicate that the slightest blow damages it; and it is extremely difficult to procure them without such violence. Some persons recommend that they should be approached without being disturbed, and struck on the back by a slight blow with a small pliant twig or cane. This blow, could it be delivered, would suffice to break the vertebral column, and thus effectually prevent them from running away. But the first difficulty is to approach them unperceived. It is like putting salt on the bird's tail; and when they can be so approached, the blow must be very slight indeed, in order to avoid breaking the skin, and yet strong enough to accomplish the end in view, which requires discrimination. In fact, they are not easily obtained.

The spring is the period when it is most desirable to attack them. At the commencement of this season, the sun, for which they crave, leads them to issue from their winter retreat, while the heat in which they display themselves seems rather to render them torpid than to vivify them, as it does later in the season. Slow to move at this season, they will suffer themselves to be approached without stirring. In this state their hole may be covered with a handkerchief, and their retreat cut off. Having no place of refuge, they may now be caught by the hand without injuring them, taking care at the same time to avoid their bite; not that it is dangerous, but it causes a considerable bruise and a livid contusion. The tail is very fragile, and must neither be seized nor struck. Nevertheless, in spite of every precaution, if it is separated from the body, it should be secured, and, with a little ingenuity and care, it may be replaced in mounting.

The chase of ophidians is, without contradiction, a dangerous occupation, the bite of many of them being venomous, but their skin is less delicate than the lizard's. They are slower in their motion, and consequently more easily secured. Should any of my readers have a fancy for this pursuit,—which, I confess, I have not,—let them furnish themselves with a pair of long-handled pincers and a bag made of skin, with a mouth formed

with two semicircular rims attached, and tested and secured by a cord; the bag being sprinkled over copiously with snuff, the trap being laid and baited, when the reptile approaches it the pincers are employed, and if they are adroitly used, the serpent is introduced into the bag, which instantly closes, and the serpent soon dies, for snuff is a deadly poison to it.

BATRACHIANS, or frogs and toads, are neither dangerous nor difficult to take. They are cold-blooded, slow, and heavy, and cannot escape by flight. They haunt dark and humid places, and the safest way to take them, so as to avoid injury to the skin, is to seize them with the hand, either naked or gloved. With the exception of the larger species, reptiles are not usually mounted. The vivid and brilliant colours of the majority of them are extremely beautiful, and are best preserved in spirits of wine.

FISH are captured by many different processes: in soft water by line and bait of many kinds; in the sea these means are insufficient, but give place to other processes, on which we need not enter here. Fish are sometimes stuffed, but generally are only divested of the intestines, and plunged into alcohol; sometimes the dead skins are mounted on paper.

CRUSTACEA are preserved for a long time in salt water. After many years in this water their colours are only slightly altered. They may be transported to any distance in this preservation of colour. This process preserves the animal perfectly intact.

MOLLUSKS are procured with equal ease, but they are unfitted for mounting. The animal discolours, and even gets as hard as horn, without some means of preserving it in its natural state. They are generally sought for their shells.

INSECTS.—Among insects, butterflies and moths are the most attractive; and in indicating the locality in which they are to be found, I might content myself with the well-known advice of an eminent entomologist, in reply to a similar question, "Search everywhere." I will, however, specify a few places where I have found some of the most beautiful of them. The white admiral, distinguished by the silvery blue and brown markings below, with bands and spots of pure white, is found in June and July, its favourite haunt being oak woods in Kent, Essex, and Sussex, and, I believe, also in the north of England. The purple emperor, so named from the splendid purple of its wings, is also a denizen of the woods, being found near Colchester in the Great and Little Stone Woods, in the Forest of Dean, in Darenth Wood, and other and similar locali-

SKINNING AND PREPARING BIRDS.

ties. Others, as the wood white, are found near fields of leguminous plants, and are very generally diffused. Another, which is often mistaken for it at a distance—the marble white—has, on a nearer view, streaks of black and a pale yellow, feeds chiefly on grasses, and is found in Sussex and Hampshire, and on the Surrey hills in July and August. But my space does not permit of my entering on this interesting subject further, and as I cannot return to the subject, I shall here say a few words on the best mode of killing and preserving insects. Some collectors carry chloroform in a small bottle. When an insect is captured, a little chloroform is dropped on the blotting-paper at the bottom of the box in which it is placed; this kills the insect; but the more usual way is to give it a quick nip between the finger and thumb just under the wing, which kills it instantly. It is then transfixed by passing a pin through the thorax, fixing the sharp point in the cork of the box.

On returning home set it out in the following manner:—Having provided yourself with a setting-board, which is sold at any of the naturalists' shops; place the body of the insect in the centre of the board in which there is a groove to receive it, so as to let the wings spread out smoothly without any curve. Having spread out the wings very gently, take four pins and four small pieces of cardboard of an angular shape, with the base rounded off; place the pointed end over the four tips of the wings just far enough to hold them down, and fix each down firmly to the board by passing a pin through the card into the cork. All the beauty of the preparation depends on the wings being evenly spread and lying smooth on the board, and care only is required to make them lie so.

SKINNING AND PREPARING BIRDS.

In skinning and preparing the animals whose capture we have been plotting, certain instruments are necessary. These are, 1. a case of scalpels; 2. a knife with toothed blade sharp towards the point, the other a straight blade; 3. two pairs of scissors of different sizes, one six inches long, another ten inches, and one with a short blade, the other straight and sharp-pointed; 4. two pairs of cutting-nippers; 5. two pairs of pliers for stretching wire, one stronger than the other; 6, a smith's portable vice for holding the wire; 7. a scoop for removing the

PREPARING AND STUFFING ANIMALS.

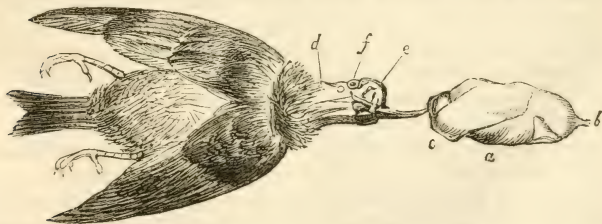
brains; 8. many files of different sizes and grains, from five to twelve inches long; 9. a quantity of iron wire of different sizes; 10. a hand-saw; 11. a small hammer and some nails of different sizes; 12. some flat files, needles of different sizes, bodkins with triangular blades; 13. pencils in horsehair and badger-hair, the one for spreading the arsenical soap, the other for smoothing the feathers; 14. thread and cotton for sewing up and stuffing the skins of animals; 15. three stuffing-wires about seven, twelve, and eighteen inches long; 16. a pair of caliper compasses; 17. several stilettos, or bodkins, varying in length, bradawls of different sizes, and a supply of arsenical soap or paste, which is prepared according to the following prescription:—To four pounds of white curd soap add one pound of arsenic and one ounce of camphor; cut the soap into thin slices and dissolve it in one pint of water. When melted, add the arsenic and camphor, stirring them well up together, and boil again until the substance of a thick paste is attained, and pour it into jars while hot. When cold tie it up carefully with bladder, and it will retain its qualities for years in any climate. A useful preservative powder is prepared as follows:—To four pounds of alum add one pound of arsenic and two ounces of the flour of sulphur; mix them well together and pound them in a mortar to break the lumps. The use made of this powder is to rub it into the skin during the process of skinning. The wire used in bird and animal stuffing varies from two sizes smaller than a pin, used for the smallest birds, as humming-birds; to two sizes larger than a pin, used for sparrows, canaries, and similar sized birds and animals. Black-birds, thrushes, oreoles, and others of the same size, require two sizes larger again; while squirrels, hares, and foxes among quadrupeds, and the eagle among birds, require a wire strong in proportion to their size.*

With these implements all kinds of animals may be skinned and mounted whose size does not exceed that of the wolf. Larger animals amateurs will probably be disposed to leave to professional hands.

In skinning a bird, having first provided all the articles for anointing the skin, a little fine tow cut short, a little cotton-

* Arsenical soap, preservative powder, boxes containing all the requisite instruments, corked boxes, and apparatus for butterfly collecting, and glazed cases of all sizes, may be obtained in great variety at Messrs. Buffon & Wilson's, Naturalists, 391, Strand, London.

wool, and some absorbing powder,—either burnt alum powdered, flour of sulphur, or plaster of Paris; and having stuffed a little cotton into the mouth, and tied or sewed the mandibles together to prevent the mucous discharge which sometimes takes place, to the great injury of the plumage, lay the bird on its back on a bench or table covered with a clean white cloth, with the head towards the left hand of the operator; part the feathers carefully on the breast, and with a sharp knife or scalpel, the handle of which it will be convenient to have with a spatula, make an incision from the sternum or breast-bone to the vent, just deep enough to cut the skin without penetrating the flesh or intestines. Raise the edge of the skin with the sharp edge of the handle of the knife, and turn it back, cutting with the knife where necessary, until the thigh-bone is reached. Having done so, seize the leg and foot with one hand and the skin with the other, and push the skin forward over the thigh until the middle joint condyles of the thigh-bone become visible; cut this through so as to leave the thigh-bone and leg attached to the skin. Having done the same with the other side, the lower part of the bird is entirely divested of its skin as far as the tail. Having introduced the blade of a small knife between the skin and the back-bone, under the root of the tail, draw it upwards so as to cut through the rump-bone, taking care that the skin is not injured in so doing. Now lay hold of the carcase by the rump-bone with one hand, or, better still, attach a hook to the rump-bone and suspend the carcase by it, and draw the skin gently but forcibly towards the head; the skin will readily peel off as far as the wings, the plumage being of course inverted. The wings are now separated from



the body by cutting off the humerus, or fore-arm, where it joins the body. The skin will now fall over the head, and, by gently pulling it over the vertebræ of the neck, the crown will be exposed. The bird is now as represented in the engraving; the

skin inverted and drawn over the head, the femur or thigh-bone attached as well as the first vertebræ of the tail *b*, the articulation of the humerus or pinion-bone *c*, where it was separated from the body, the membranes of the ear *d*, withdrawn from their cavities *e*, and the skin cut round the cavities of the eyes *f*.



The head is now separated from the body at the last vertebræ, or rather a little beyond, being cut through the occipital opening *a*, to facilitate the removing the brains, which are withdrawn through the opening. The carcase is

now entirely disposed of.

The next operation is to remove the fleshy parts from the head and cheekbones, clean out the occiput or cavity, and fill the opening as well as the orbits of the eyes with cotton-wool, having first given them a good coating with the preservative paste. Having replaced the flesh removed from the cheeks and crown with soft tow, turn the skin back over the head. The wings are now to be skinned as far as the humeral bones by pushing the skin backward over them; the bones are carefully cleaned, all flesh, muscles, and tendons removed, the bones as well as the skin covered with the preservative paste, and tow or cotton-wool wrapped round them to replace the flesh and give the appearance presented in life; the skin is then replaced.

The legs and thighs now undergo the same process. Taking hold of the feet, the skin is gently pushed back over the tibia, or leg-bones, to the knee-joint, and the flesh and tendons removed; by passing the knife round the head of the bones, the flesh and tendons will be found to strip off cleanly from the bone; a coating of soap is now given to the bone and skin, the bone is covered with tow so as to give its natural appearance, and the skin replaced; the same operation is performed on the vertebræ attached to the tail, the flesh being removed as far back as the insertion of the tail feathers, the skin and bones stripped, covered with the soap, and the skin replaced as before. The entire skin now receives a coating of the preservative paste, and is ready for stuffing and mounting. It is important that, as these different parts are finished off, the feathers should be arranged and made to fall into their places while the skin is damp, otherwise it may be difficult to get them to lie smooth and in their natural order afterwards.

The process we have just described is applicable to all land-birds, and to most water-birds also; but there are some, as the

SKINNING AND PREPARING QUADRUPEDES.

penguin, dabchick, and some others, whose natural position is nearly upright, and their breast plumage thick, white, and feathery; from their upright attitude, sewing up the breast would leave a very obvious mark in the pure white plumage. To obviate this defect, the cut is sometimes made in the side under the wing; I myself prefer making it in the back, where I can rely on finding plumage to conceal the stitches. In other respects the process is the same; but all sea-birds being very oily in their flesh, it is more necessary with them to use some absorbent for the fatty matter and blood—a subject I have purposely avoided, in order to prevent confusion in my description of the different processes.

There are, indeed, several modes of performing the operation of skinning, differing in their details, but alike in all essentials, the object being to obtain cleanliness, and avoid soiling the plumage. Mr. Waterton employs for this purpose soft cotton-wool, with which he covers the carcase up to the knife, pushing it forward as the skin is raised; others use burnt alum pounded to a powder, and flour of sulphur. The French naturalists use powdered plaster of Paris. For my own part, from long practice, I can skin almost any animal without the slightest stain on the plumage; but to those who have not had my experience I would recommend plaster of Paris, as perfectly efficient, and being the least offensive powder. It should not be too copiously applied, but just dusted over the body as the skin is removed in sufficient quantity to absorb the moisture, and no more. It is also useful in removing any stain from the plumage, and is easily brushed off when dry.

Mr. Waterton also uses corrosive sublimate dissolved in spirits of wine as a substitute for the arsenical soap, and this composition is strongly recommended by other naturalists, but I have not found anything so perfectly satisfactory as M. Bécour's soap. At the same time let me remind the reader that it is a very deadly poison, and should be applied with great caution, with gloves, on the hands, kept for the purpose, to prevent its getting under the nails or other parts, and that it should never be suffered to be about within the reach of children or animals; moreover, that it should always be marked "poison" on the jars.

SKINNING AND PREPARING QUADRUPEDES.

The fox admits of most picturesque attitudes and accessories, and will admirably serve our purpose as an example.

Therefore, Reynard being procured, we need not say how, lay him on his back in the same position as before recommended; and, having first stuffed the mouth with cotton and tied it up, and measured his neck and body with rule and calipers, and noted them, proceed. Make an incision from the last rib nearly to the vent, but not quite up to it. Having done so, proceed to raise the skin all round the incision as far as the thighs, first skinning one side and then the other, using the flat end of the knife in preference to the blade to raise the skin. Having reached the hind legs, separate the latter at the femur or thigh-bone close to the back-bone, leaving the legs attached to the skin. Now skin the head-quarters close up to the tail, and separate it from the body at the last vertebræ, taking care not to injure the skin. Pull the skin over the heads of the hip-joints, and now the carcase may be suspended by the hind-quarters, while the skin is stripped by pulling it gently and cutting towards the fore-quarters. The fore legs are separated from the body, as the hind ones had been, close to the shoulder-bone, and the skin fairly pulled over the head and close to the nose, when the head is separated from the body by cutting through the last vertebræ of the neck. Reynard is now skinned, the head, legs, and tail being all attached to the skin, from which the carcase is separated.

The flesh is now cut entirely away from cheek-bones, the eyes removed, the brains taken out by enlarging the occipital opening behind the cranium, the whole cleaned and supplied with a coating of arsenical paste, and stuffed with tow or wool to the natural size.

The legs are now successively skinned by pushing out the bones and inverting the skin over them until the foot-joint is visible; every portion of flesh and tendons must be cut away, and the bone cleaned thoroughly, and a coating of arsenical soap laid over it as well as the skin. Wrap tow, or cotton, or any other suitable material, round the bone, bringing it to its natural shape, and draw the skin over it again. Do this to each leg in succession, and the body itself is ready for stuffing and mounting.

The utmost care will not prevent accidents: the fur and plumage will get sullied, and before stuffing it is well to examine the skin, for stains and spots are calculated to deteriorate its appearance. Grease or blood-spots may be removed by brushing over with oil of turpentine, which is afterwards absorbed by dusting plaster of Paris over; Macgillivray recommends

PREPARATIONS FOR REPTILES.

that all skins, whether they are to be put away in a cabinet or stuffed, should receive a washing of spirits of turpentine sprinkled on, and gently brushed in the direction of the feathers or fur. Not to trust too much to memory, it is desirable to measure and note the proportions of the animal before skinning, first taking the muzzle to the tail. Afterwards, from the junction of the tail to the tip. Secondly, from the middle of the shoulder-blade, or scapula, to the articulation of the femur, or thigh-bone. Thirdly, the animal being placed on its side, measure from the upper part of the scapula to the middle of the sternum—that is, to the spot where the two sides meet above, and finally from the socket of the scapula to the socket of the articulation of the femur or thigh-bone. In addition to these, note, by measurement with caliper compasses, the size of the head, the neck, the tail, and other points which affect the shape of the animal. These measurements will serve as a guide in stuffing, and for the size of the case and length of the mounting wires. In the process of skinning, it is important to avoid penetrating to the intestines, or separating any of the abdominal muscles which lead to the intestines: any such accident would be very disagreeable, as well as injurious to the skin.

PREPARATIONS FOR REPTILES.

In preserving reptiles, many different modes are adopted by different naturalists. The first and most simple of all usually employed by travellers, is to put them, when small in size, into a vase or bottle of spirits—of spirits of wine, for example—but before plunging them in, it is necessary to make an incision in the belly, so that the liquor may enter the interior of the body, and preserve the intestines. This may be employed for lizards, frogs, toads, serpents, and for all reptiles not too large. For the larger kinds, as the crocodile, for instance, it is necessary to skin them; and this is done in the same way as in the larger mammiferæ, only their skins being excessively hard and provided with scales, it is necessary to prolong the incision from the belly to the throat. Without turning the skin inside out, raise it from the body. For the turtles, it is necessary to have recourse to a hand-saw; their envelope, especially in the terrestrial species, being so hard that it cannot be cut. The plastron, or breastplate, is separated from the carapace by making an incision on each side, and cutting through the skin which surrounds the anterior and posterior members with a

scalpel, thus leaving the plastron free, and withdrawing all the intestines from the place. The skin is now removed from the other members, which are furnished with a paw so hard that it is necessary to cut it open from top to bottom in order to remove the fleshy parts beneath the shell. With regard to the head, the skin need not be completely inverted, because the plates or scales upon it can be detached from the superficies; it is only necessary, therefore, to scoop out the eyes without damaging the orbits and the brain, enduing all the parts thoroughly with arsenical paste before covering them with the tow on which the shell is to be replaced. The breastplate thus restored is held in its place by means of iron wire properly inserted.

Some serpents are so large that it is necessary to skin them in order to their preservation. This is sometimes done by making a cut round the neck immediately behind the head, raising the edge of the skin round the incision, and drawing the body through it, thus turning the skin inside out, a process which might, in some instances, be attended with danger as well as difficulty. A more convenient process is to make a longitudinal incision into the belly, but a little on one side, taking care to avoid damaging the large scales by cutting on one side of them. This done, the skin is raised by means of the scalpel, the head separated from the body at its last vertebræ, leaving the head attached to the skin. When entirely separated from the vertebræ, the brain removed, and the cavity cleaned out, cover the inside of the skin with a coating of arsenical paste, or wash it with spirit of turpentine and sew it up neatly, placing a layer of cotton-wool under the seam, taking care not to catch it up with the thread so as to prevent the stuffing from showing itself through the interstices. This done, fill it with dry sand, or, better still, with sawdust or bran. It is important in all instances to preserve the head of serpents as perfect as possible, as on its construction much of the zoological character of the animal depends.

PRESERVING AND SKINNING FISHES.

The same means applied to serpents may be employed for preserving fishes; but before putting it into practice the fish must be washed in a mucilage which prepares them for the spirit in which they are to be preserved. This is best done by

making an incision under the belly, a little on one side, so as to avoid cutting the fins; then, raising the skin from the sides by the handle of the scalpel, separate the body from the tail, and turn the skin towards the back in order to save the dorsal fin, detaching the body from the head near the occiput, and withdrawing the gills in order to wash and dry them. The skin is now ready either for stuffing, sewing up, and mounting, or for stretching between sheets of paper, which preserves its colours; in this process the fins are afterwards fixed upon plates of cork or cartridge-paper by means of pins. There is not much to commend in this last process, for the fins, which are the most striking characteristics of the fish, soon become defaced.

PRESERVING CRUSTACEA.—Small crustacea are easily preserved by plunging them into spirits, or even into chalky water, in which they may be preserved some time; after which they may be taken out and dried. Marine salt also preserves them; but for larger species other means must be employed, which approach to the skinning process although not quite belonging to it. In order to get rid of the fleshy matter and the gills, it is necessary to raise the shell which covers the back of most of the species. The carapace, as the shell upon the back is called, is replaced, after covering the bed with arsenical soap and stuffing with cotton to replace the flesh removed. The shell is held in its place by being gummed round the edges. When operating on species furnished with formidable claws, the smaller opposing claw may be removed, the flesh extracted through the orifice, and the claw restored to its place. Mollusks, as the occupants of these shells are called, are sometimes covered by a shell, in other species the body is always naked. Both the marine, fluvial, and terrestrial species, may be preserved in alcohol. The shellless mollusk may be otherwise preserved alive; but those with the shell, where it is desired to preserve that appendage apart from the animal, the only mode is to plunge it into some spirit in which it can only live a few minutes; when dead, it is easily withdrawn from its shell by means of a piece of wire. When it is wished to preserve the shell and bring out its fine colours, a weak solution of nitric acid is employed, brushing it with a hard brush; for a second washing use pure water. After which it is again plunged into fresh water to remove any of the acid which may remain, when it may be wiped dry with a soft rag, and a coating of oil applied which brings up its colours.

There are some marine creatures, such as the star-fish, echinites, and some others, which are dried with very little preparation. The echinites are difficult to preserve, however, with their spikes, and the only certain mode is to place them in spirits of wine, and wrap them up in linen, which may be double or even triple when they are to be carried any distance. It is necessary first, however, to put them in fresh water in order to make them disgorge certain saline matters, withdrawing them afterwards and putting them into a dry place.

STUFFING AND MOUNTING BIRDS.

Skins are sometimes kept so long as to have become hard and dry; or they may be the skins of other climes which it is desired to stuff and mount. I have already given directions for preserving and moistening the skins of larger animals, but there are hundreds of skins of birds and small animals sent daily from India, Africa, America, and various other places, which require a different mode of treatment from those that are stuffed immediately after being skinned. These skins, by the time they reach England, are of course very dry, and require to be thoroughly relaxed before they can be brought to a fit state for stuffing. One plan is to get an earthenware pan with a lid, and put three quarts of silver sand in it; after well washing it, drain the water off and put a sheet of blotting-paper on the top of the sand, and on this place the dry skins, as many as will cover it without crowding, then put the lid on and allow them to remain several days, when they will be found quite fit for stuffing. Another method, which I find to answer very well in most cases, is to take the wadding carefully out of the skins, damp it, and replace it; then get a clean damp cloth and roll the skins in it; by this process, in the case of the skins of small birds, they will be ready in twenty-four hours, when they can then be stuffed in the manner I am about to describe. In the case of birds of paradise and humming-birds, whose skins are extremely delicate, it is found sufficient in practice to suspend the skins over damp tow or moss after unstuffing them.

The same remark applies to specimens requiring remounting, the old stuffing being drawn out with a hooked wire and replaced by wet tow, while a wet cloth is folded round, the skin soon becomes moist and pliable, unless they have become very hard indeed, when hot water, or the bath already described

might be used. I assume, however, that we have to do with a recently removed skin which requires no such preparation.

Having all the required materials at hand, which consist of some fine cut tow or cotton-wool, or both; suitable sized wires, a stuffing wire (which consists of a strong wire, one end of which has been beaten out into a spoon-like shape), a pair of cutting-nippers and pliers, and the other tools already described; lay the skin on its back, as before, with its head to the operator's left; take a piece of wire of suitable size, and of sufficient length to project an inch or so beyond the head and rump of the bird. Having filed both ends to a point, take a piece of cork long enough to reach from the rump to the side bones of the wing, pass the wire through this piece of cork and double up one end of it so as to form a loop or staple, the loose end of which is also fixed in the cork. Now proceed carefully to stuff the head and neck if not already done, imitating the form of the head and the muscles of the neck to the best of your ability. This part of the process, as well as stuffing the head, requires great care; no inequalities of surface must appear except those natural to the attitudes and natural muscles of the part. The head stuffed, let it be carefully examined, and any defects in the stuffing corrected; this may be done by means of a hooked wire or pointed bodkin inserted through the openings of the eyes; but it requires great care, otherwise the orbits may be irretrievably injured. Having arranged the head and neck in a satisfactory manner, bearing in mind that all parts of the skin and bone should be covered with soap or some other preservative, the pointed wire may be pushed up the stuffing of the neck, and through the crown of the head, until it projects an inch or so beyond the cranium.

Two other wires are now selected of sufficient strength to support the bird; these are also filed to a point at one end, and of a length suited to the legs of the bird, and are passed through the feet by the side of the leg-bone. One end of the wire is left projecting three or four inches through the foot; the other end, after being regulated to a suitable length, and bent so as to accord with the shape of the body, is pushed through the cork at the point where the legs were separated from the body, and firmly riveted into it, or at least twisted at the opposite side.

According to some methods, no cork is made use of, but a loop is formed in the body wire at this point, to which the wires of the leg are twisted on each side, and the place of the cork

supplied by stuffing; in either case the position of the legs is a very important element of success. In posing a bird, the talons should never extend beyond the rump-bone, but much will depend on the attitude the bird is to assume.

Where the tail is a small one, and is intended for a sitting or perching bird, the single wire loop attached to the cork will generally support it. But where the tail is long, or is intended to be expanded, a second wire of smaller dimensions is used; this wire, being filed to a point, is also bent in the form of a staple, with a broad or narrow exterior according to the shape of the tail to be supported. The sharp points of this staple are forced through the portion of the rump-bone left attached to the tail, and inserted into the cork, while the bone rests against the first wire, which thus acts as a fulcrum to the tail. The bird now

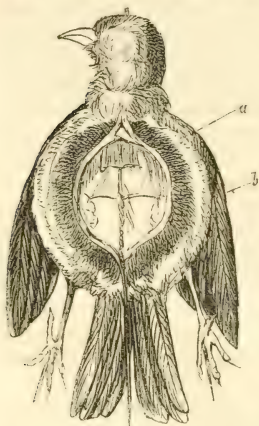
shows, as represented in the engraving, the body wire occupying the centre of the body, and coming out at the tail and through the cranium between the eyes, while the wires of the legs and wings are attached by a loop to the body wires.

The process of stuffing the body now commences; the tow or other material used being wound round the wires until something like the shape of the bird is attained. The legs and thighs claim particular care; the wires which represent the tendons may be twisted in any direction, but considerable skill will be required to represent truly

the form of the thighs and bend of the knees.

The set of the tail also requires much care; the flesh and bone removed are replaced by tow or cotton-wool, which is pushed in with the stuffing wire.

The operation of sewing up is now performed, during which the stuffing is completed, all vacant places being filled in with soft tow or cotton by means of the stuffing wire. As the work proceeds, the caliper compasses will now be found useful if the previous measurement of the dead bird were carefully made. The sewing should be very neatly done, with fine cotton-thread, taking care that none of the feathers are caught by the thread.



The stuffing and sewing up finished, and the feathers brushed and placed in their proper order, a perch is provided for the bird if it is a perching bird. Two holes are bored in the perch at proper distances, through which the wires of the feet are pushed and riveted on the other side.

The wings are the next consideration. Having fixed upon the position they are to occupy, cut two pieces of wire of sufficient length to carry out the design; if they are to lie close to the body, a small wire passed through the first pinion joint through the stuffing, and into the cork, will keep them in their position. When they are expanded as in flying, the tail must be expanded also; in this case the wire should be long enough to support both joints of the wing, through which it is passed into the cork in the body. I am not sure that one wire long enough for both wings would not be an improvement on this arrangement. Each end of the wire being pointed, it could be pushed through the joints and the wire twisted into the required form, support being given to the wings by cardboard, cork, or by double wire, as with the tail, where they were too heavy for one wire. And now, it is only necessary to fix the eyes, which is done in various modes: some eyes, being provided with a shank, are stuck into the matter used for stuffing the head, using a little gum round the edges; others fix them in with a little putty; the orbits are dressed and painted, the feathers neatly arranged in their places; and some naturalists wash the whole surface with rectified spirits of turpentine, both as a preservative and to give gloss and brilliancy to the plumage.

The operator's taste may now be displayed in giving the finishing touch to the setting of the bird. If the work has been well executed, and the wires firmly inserted and riveted, the neck, head, wing, feet, or tail, may be twisted in any direction without fear of dislocation, and a good memory will enable him to give it a natural and life-like appearance.

The attitude must of course rest with the operator; but a few words on the subject may direct his attention to certain anatomical results which should accompany particular attitudes. A bird seizing its prey, for instance, stretches out its leg with extended claw and with head and neck bent forward, wings raised in an arched form, and tail spread out vertically, and the body also bending forward. In flying, the wings are spread out to their whole extent, the tail in a line with the body and expanded, the claws closed, and the legs drawn close to the body. In a bird surprised, the side on which the alarm has originated

is raised, the wing on that side slightly elevated, the head turned in the same direction, and the foot advanced, the tail drooping, but raised slightly towards the point of alarm. Perhaps, however, the tyro will obtain a better lesson on this subject than we can give by studying the attitudes given to birds in the sketches of Mr. Harrison Weir, some of whose drawings illustrate the series of books to which this belongs. The Landseers, Ansdell, Wolff, and several artists of well-known repute as painters of animals, may also be studied with advantage.

But his task is not yet finished; however carefully the skinning may have been performed, there will be a difficulty with some of the feathers. In order to keep them in their place, and get them to be smooth, it is sometimes necessary to dress them with a modeller's iron, heated, taking care that the iron is not



hot enough to scorch the feathers. Having got them into a proper state, the French curators bind long bands of soft paper round them to keep them in that position, fixing the paper by means of pins, as in the engraving. My own practice, and, I

believe, that of most English naturalists, is to keep the feathers in their place and position by winding cotton-thread round them. By this means, having smoothed a feather into its proper curve at the hollows and twists of the neck, for instance,

by winding a thread round it in two or three places while it is damp, I can be certain that it will retain that position when dry; the thread wound round the body keeps every feather in its place. This, I think, cannot be accomplished by a paper band, however skilfully placed.

STUFFING AND MOUNTING QUADRUPEDS.

Before commencing operations, it is necessary to have the materials which are to form the carcase at hand, as well as the wires which are to form the framework, which must be proportioned to the size of the animal. Cut the wire into five pieces, of which four are for the limbs and the fifth for the body. This

last is the frame to which all the others are attached; for mammals which have a tail of any length, it is necessary to have a sixth wire, a little slighter than the others, to represent that appendage; each wire intended for the limbs and tail being, of course, as long as it is intended to make the member, with six inches over to insert in the board on which it is to be placed; the central wire or framework the length of the animal; and a third longer, for loops and projections.

Commencing with the tail, which is made up of the vertebræ cleaned as far as possible from all fleshy ligaments, whose office is now performed by the wire which has been thrust through them; round these tow is wound in regular order, until it has acquired in its whole length the necessary degree of thickness: this done, cover it well with a coating of arsenical soap or corrosive sublimate, and, thus prepared, introduce it into the caudal envelope in such a manner as to resemble the natural tail of the animal.

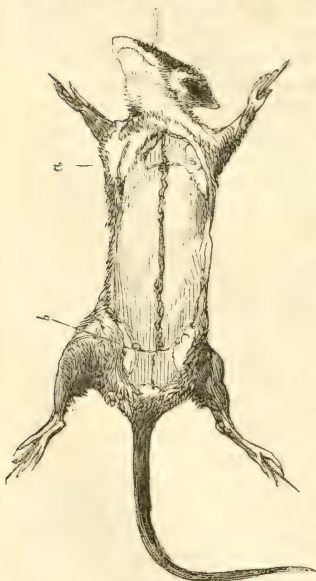
And now the wires for the fore legs, being reduced to the proper length, are inserted into the foot and pushed through by the side of the bone, and tow is wound round them in such a manner as to represent the muscles and flesh upon the limbs, terminating, as in the case of the tail, at the upper part; the limbs, being each, in their turn, thus shaped and covered with a coating of preserving paste, are inserted in the skin, the wire projecting through the centre of the foot; but as it is not always possible to give the exact form to the limbs in this stage of the operation, it is attained afterwards by stuffing cut wool into the parts to fill out to the proper shape of the model. The hinder limbs are prepared in the same manner, but with greater difficulty, from the complicated character of the tendons. At the Musée de l'Histoire Naturelle at Paris, Madame Charpentier gets over the difficulty by taking out the tendon and replacing it by a second wire, which is made to enter the bone of the foot, and is afterwards attached to the knee-bone. The bones of the hind leg being properly endued with preserving soap, the form of the limb is exactly imitated and inserted into the skin, as we have indicated for the others.

The four members and tail thus disposed of, the head demands the utmost attention, especially the lips and eyes. The arrangement of the lips consists in replacing the fleshy parts, which have been removed, by stuffing. The cotton-wool is not sufficiently plastic for this operation, and requires to be well mixed with arsenical soap, so as to form a sort of thick paste of the

consistence of putty. With this the form of the animal's lips are moulded, or modeller's wax may be used for the same purpose, so as to fill up the more delicate fleshy parts, which have no hairy covering; the cheeks being stuffed with fine cotton-wool, retained in its place sometimes by a piece of fine calico, which surrounds the head, the whole being covered with soap. The skin is now drawn over the whole as far as the cartilages of the ears, which are sewed on and fixed in their place.

The sixth wire or framework is now fixed in the middle of the body, from the neck to the tail, penetrating the bones of the head between the eyes, as represented in the engraving, the wires for the four feet and tail being attached in the following manner, having previously surrounded the wire with tow approximating to the thickness of the neck of the animal: At the junction of the anterior members with the body, a loop is made in the body wire to which those forming the limbs are firmly attached; a cork is sometimes placed at the end of the body wire, to which the tail is attached, as in the case of

birds, but in general the wire which forms the tail is only twisted round the central wire in such a manner as to form a sufficient fulcrum for carrying the tail. All the wires being attached, and the members placed in the position they are to retain when the animal is mounted, the stuffing may proceed. We have now to do with the neck, which was roughly stuffed to receive the body wire. It now requires more careful stuffing with fine material to bring out the contour and muscular swellings. This should be stuffed with great care, first giving it a coating of soap; no void must be left near the head, nor must it be thicker than in nature. As the operator approaches the body, as much natural form should be



given as possible. In sewing up, also, the suture of the two

STUFFING AND MOUNTING FISH.

edges of the skin should be neatly executed so as to be covered with the hair, commencing at the breast, which permits the tow used to be more easily supplied when it fails, the stuffing should be finished as the sewing proceeds; using a stuffing-wire and fine tow or cotton-wool for the purpose.

The animal is now fixed upon the board it is to occupy, four holes being pierced in it at proper distances, the lower extremities of the wires, forming the limbs, are placed in them, and riveted beneath the board in such a manner as to render the figure of the animal immoveable. And now the eye of the artist comes into play; the attitude which is most natural to the animal when living is now to be imitated, and on the taste of the operator will depend whether the imitation is successful or not.

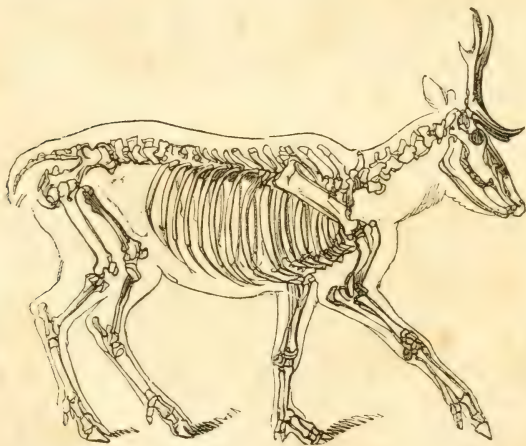
The mouth is now to be arranged, and the lips moulded into form, the nostrils reduced to order and filled with cotton to hinder them from shrivelling. Finally, the orbits of the eyes are put in proper condition to receive artificial eyes, which are held firmly in their place by an application of gum to the edge of the pupils, while the ears are held to their places by pieces of cardboard or linen, occupying the place of the cartilages. And now the animal is left to dry, during which it should be looked at daily to see that the skin does not in drying get puffed out in some place, or show differences in another—accidents which should be remedied at once by means of the bodkin already described.

STUFFING AND MOUNTING FISH.

In most fishes there is a line from head to tail in the middle of the body. Place the fish on its side, and, with a sharp knife or pair of scissors, clip the gills; then proceed to clip the skin from head to tail down that line; a paper-knife is the best thing for dividing the skin from the body. Having separated the skin from one side, cut the back-bone through at both ends, and proceed to skin the other in the same way. Remove the eyes, and a little flesh under each eye, and rub the skin well in the inside with preservative, and sew up the skin again, beginning at the tail, and sew up by degrees, as it is fitted to its proper shape, using wet bran, putting a flat piece of wood in the middle of the body, with two pieces of wire fastened in it, to support the fish. The wood must be the length of the fish. Be careful to mould the fish to its proper shape while it is damp; then let it dry.

PREPARING SKELETON LEAVES.

Gather the leaves from the middle of summer to September, put them in one gallon of soft water, let them soak for almost a month, and then take out a leaf and try it; if it is ready, the green coat will rub off directly and leave the fibre; some will take two months before they are ready; but you can always tell by rubbing the leaf rather gently. After obtaining the skeleton of the leaves, place them in one quart of water, with two table-spoonfuls of chloride of lime, well mixed; let them remain about twelve hours, and they will be perfectly white. Keep them in a close box until you want to use them. The best and most ornamental way to mount them, is to get either round or oval shades and gilt or black stands; cover the stand with velvet, black or coloured, according to taste, and then arrange the leaves so as to form a pretty group; when the shade is placed over it, with chenille, it will be a very handsome ornament.



SKELETON OF THE REINDEER.





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Bird & Animal Preserver (by appointment) to Her Majesty,
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Patronized by the Nobility.

This Powder if applied according to the following directions, will be found unrivalled in destroying Beetles, Moths, and every other species of Insect, in all their stages. J. G. is now enabled, after 30 years' experience, to place before his Patrons, Friends, and the Public, an article which he has well tested himself, that will totally destroy all insects that are injurious to Stuffed Birds and Animals' skins, Woollens, Cottons, Plumes, Muffs, Tippets, Aviares, Dove Cots, Dogs, Cats and Poultry.

It is recommended to proprietors of Hotels, Boarding houses, &c. It is clean in its application, and adapted for exterminating those pests in the sleeping apartment, so difficult to get rid of. If placed in Drawers, Chests, or Wardrobes where woollen Cloths or Furs are kept, or any other garments or substance that Insects prey upon it will totally annihilate them. If a room is fumigated with a few grains on a hot plate or chafing dish, closing the door and windows for a few minutes and then open them, all living insects in the room will disappear.

Sportsmen will find this powder invaluable as a remedy against Fleas and Nits in Dogs, and it can be applied without any apprehension, as it is not poisonous.

Some persons who had been great sufferers in their goods, and have applied for this Powder, are now selling it adulterated, and getting a large profit on it. J. G. thinks it but justice to himself, to inform the public that his Powder is the genuine which he has used for many years, and has never failed.

Directions How to Use It.

If bought in small boxes, it is best to keep it in the small bag as it will be found when opened, and when wanted to be used, knock the bag against the crevices of the Bedstead, seams of the Mattress, &c. Dust it in the blankets, and a little on the floor. If living animals, dust them on the upper part of them, brush them so that it goes to the roots of the Hair, have a cloth under so as to collect what falls, as it can be used again as it does not lose its power by use.

Ladies' Muffs and Bows, and other skins made into rugs, such as Bear-skins or Sheep-skins, a pepper box or flour dredge filled with the powder may be used well shook over them, brushed well in and combed into them, worked down to the roots, and let it rest till the rugs are wanted. If the Moth should be in them it will entirely destroy them.

Families leaving home will find this Powder invaluable for preserving their goods by taking this precaution—

Lay a large Sheet on the floor. Be careful to well shake all your articles before the Powder is put on, then spread out a Blanket—dredge a little of the Powder on it; then turn it and dredge the other side; and the same with the Furs, Curtains and other materials, one on the other. Then fold them up, those that are not wanted, and place them in drawers; those that are wanted for use, shake the Powder into a box and collect it and put it into the box, as it will be fit for use again.

All your Blankets and Furs and other goods will be free from Insects, if these Directions be strictly followed out, and £1 worth of this Powder will preserve £20,000 worth of goods. If these Directions should not be sufficient, J. G. will have great pleasure in giving any further instruction. The Box should be kept air-tight.

Boxes of Powder can be procured from 1s, which for small families will be sufficient for 3 months, and for a large mansion £1 worth will serve for 12 months. Boxes from 1s to 5s are generally used in families, those who have tested it never being without it.

Can be had of James Gardner, 426, Oxford-street, London. W.C.

Worley, Printer, 13, Moor-st., Salford.





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